

NOMINATION FOR ENGINEERING HERITAGE RECOGNITION

HINDMARSH BRIDGE – THE ROAD TO THE PORT



ENGINEERS
AUSTRALIA

Engineering Heritage SA
December 2014

Cover photograph: The Hindmarsh Bridge shortly after its opening in August 1880 [State Library of SA B43193]

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1. Nomination for Engineering Heritage Recognition

The Administrator
Engineering Heritage Australia
Engineering House
11 National Circuit
Barton ACT 2600

Name of work: Hindmarsh Bridge

Location: Port Road, Hindmarsh
-34.90985, 138.57349

Owner: Department of Transport
PO Box 1
Woodville SA 5011

The owner has been advised of this nomination
and a letter of agreement is attached

Access to site: Unrestricted public access

Nominating Body: Engineering Heritage SA

Richard Venus
Chair, Engineering Heritage SA
Date: 9 December 2014

2. Agreement of Owner

From: Wilksch, Grant (DPTI) <Grant.Wilksch@sa.gov.au>

To: Richard Venus <rjv@esc.net.au>

Date: Thu, 11 Sep 2014 14:45:14 +0930

Subject: RE: Heritage Recognition of the Hindmarsh (Port Road) Bridge

Richard,

We will support the nomination of the Hindmarsh Bridge crossing for recognition by Engineers Australia under the national Heritage Recognition Program. Please advise me of the further assistance you require.

I have no objection to affixing an Engineering Heritage Marker to one of the existing masonry pillars. As they likely to be the property of the City of Charles Sturt approval should be sought from them.

We will also take up the opportunity to replace the missing commemorative plaque prior to your celebrations. I have attached a drawing of the original plaque to assist you in developing the artwork. I assume we will take responsibility for ordering the replacement plaque and its installation.

Regards

Grant Wilksch

Supervising Engineer - Bridge Management

Bridge & Marine Assets

Specialising in Structural, Geotechnical and Marine Engineering.

Transport Services Division

Department of Planning, Transport and Infrastructure

From: Linda Lacey <llacey@charlessturt.sa.gov.au>

To: 'Richard Venus' <rjv@esc.net.au>

Subject: RE: Heritage Recognition of the Hindmarsh (Port Road) Bridge

Date: Thu, 9 Oct 2014 01:19:00 +0000

Hi Richard

I've had a chance to discuss the heritage nomination and plaque proposal with my manager, and I've got some good news.

The bridge does not belong to the City of Charles Sturt, therefore there is no need for us to present a report to council on it being nominated for engineering heritage recognition. As you've already indicated that DPTI are happy with the proposal, this means that you can go ahead with the nomination.

Once the nomination has been accepted, we are happy for you to go ahead and install the required plaques. Again because this can be done under your own resources, we do not need to be involved, other than advising us as to when this will be taking place. ...

Kind regards

Linda Lacey

Cultural Heritage Project Officer

Community Projects Unit

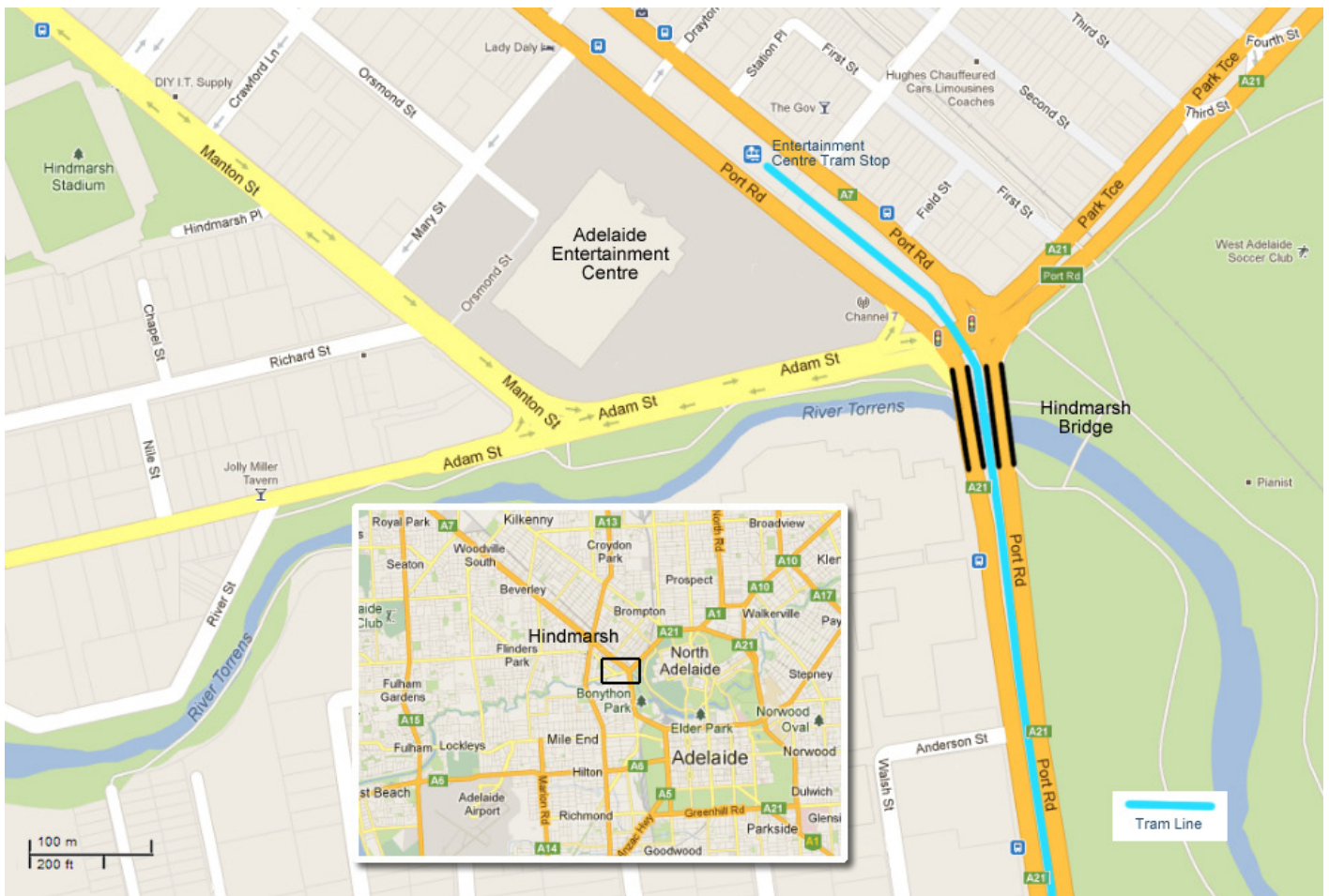
City of Charles Sturt

72 Woodville Road, Woodville SA 5011

www.charlessturt.sa.gov.au

3. Description of Work

Name of Work:	Hindmarsh Bridge
Other/Formal Names:	Thebarton Bridge (1848-1880), Wilkins Bridge (1844-1848)
Location:	-34.90915, 138.57708 (see map, page 4) The bridge carries the Port Road across the River Torrens
Address:	Port Road
Suburb/Nearest Town:	Hindmarsh SA 5007
State:	South Australia
Local Government Area:	City of Charles Sturt
Current Owner:	Transport Services Division Department of Planning, Transport and Infrastructure
Original Owner:	Transport Services Division Department of Planning, Transport and Infrastructure
Current Use:	Major arterial road; from 2010, also carries an extension of Adelaide's only electric tram service
Former Use:	Three previous bridges at this site (the first two being built of wood) have connected the city and its port from 1844; from 1880, the third bridge (an iron girder bridge) also carried the horse tram service to Hindmarsh
Proposed Use:	Unchanged
Designer:	Structural Services Section of Transport SA
Builder:	York Civil
Date Started:	February 1995
Date Completed:	November 1996 Tramway added 2010
Physical Description:	Two identical sections were built with the central gap spanned by precast concrete slabs forming the median divider Reinforced concrete road deck on ten haunched steel girders resting on reinforced concrete abutments supported by driven concrete piles (Franki piles) To carry the dual tramway tracks, an additional girder was installed between the sections and the decks were connected by an infill section
Physical Condition:	Good
Heritage Listings:	None
NOTE:	What is being proposed for recognition is the crossing rather than the current bridge which is just the latest in a series of structures erected across the river at this point. The evolution of engineering materials – from rough-hewn logs to timber to cast iron and masonry and now to steel and concrete – is a significant aspect of its heritage.



*Hindmarsh Bridge Location
[Google Maps]*



*Roundabout at the top (city) end of Port Road about 1950
The bridge is to the left with the brewery in the background
[Photo: Hindmarsh Historical Society]*

4. Assessment of Significance

Historical Significance:	<p>An important river crossing connecting the city to its port</p> <p>In the early days of the Colony, the first bridge here was often the only one standing after floods damaged other bridges in the city</p> <p>Successive structures show a developing construction capacity and use of engineering materials – timber, iron, then concrete and steel</p>
Technical Achievement:	<p>Evolving use of engineering materials indicating the development of the city and state</p>
Social Impact:	<p>Connected the capital city and its port; now part of the arterial transport network</p>
Significant People:	<p>Edward Frome, Colonial Engineer</p> <p>Davies and Wishart, construction contractors</p> <p>Daniel Fleming, first Commissioner of Highways</p> <p>Samuel Perry, founder of Perry Engineering</p>
Rarity:	<p>Conventional girder bridge of conservative design</p>
Representativeness:	<p>Conservative and economical design based on best practice at the time – the focus of the nomination is the crossing and not the present bridge</p>
Integrity/Intactness:	<p>The bridge is in original condition and well maintained</p>
Research Potential:	<p>This nomination document provides a concise history of the bridges at this crossing point</p> <p>Little is known about Wilkin's Bridge and an assumption of its construction has been made on the basis of it being described as built "in the American fashion"</p> <p>Further details of Frome's timber bridge might be found in State Records</p> <p>The demolition of the iron bridge was carefully documented and revealed no new insights into its design or construction; again, a search of State records might reveal more detail</p> <p>Davies and Wishart were responsible for many significant infrastructure projects throughout Australia – their joint and separate stories should be studied, starting with newspaper accounts of basic information such as the tenders which were let</p>

5. The Hindmarsh Bridge



Hindmarsh in 1864 – showing All Saints Church and a gully leading to the River Torrens [From a painting by James Shaw, State Library of SA, B18890]

5.1 The Line of Road to the Port

Hindmarsh was the first township to be established outside the City and was named after the Colony's first Governor.¹ It was soon followed by the villages of Thebarton and Bowden on the southern side of the River Torrens. The river attracted industries such as tanneries, wool-washing, flour mills and breweries² and the area, immediately west of the Parklands, developed quickly to the point that a reliable crossing over the river was sorely needed. A meeting of the Hindmarsh town proprietors was called on 5 August 1839 “for the purpose of taking into consideration the propriety of erecting a bridge across the Torrens, and other important business”³ but nothing seems to have eventuated. Another meeting of interested parties was held at the Hindley Street premises of merchants and importers, William Blyth & Son, on 27 April 1840.⁴ This was followed by a well-advertised public meeting at the *Great Tom of Lincoln* hotel in Thebarton on Monday 4 May. The meeting unanimously carried the motion that:⁵

... it is the opinion of this meeting that a Bridge across the Torrens, on the line of road from the Harbour between Hindmarsh and Bowden as laid down by Colonel Light, is in consequence of the increase of the traffic, and in consequence of the increase of the population of the contiguous neighbourhood, become absolutely necessary.

The meeting also resolved to take up a subscription and a committee was appointed with William Blyth as treasurer and William Holden (who had called the previous year's meeting) as secretary. A number of advertisements were published in May and June and the *Southern Australian* reported: “Nearly £200 has already been subscribed, and yet, as we are informed, only one part of Hindley-street has been canvassed”.⁶ Despite this auspicious beginning, nothing again seems to have eventuated. Historian Ron Parsons suggested:⁷

¹ *SA Gazette and Colonial Register*, 21 July 1838, p3c

² Susan Marsden, 1983, *Hindmarsh: A Short History*, SA 175 website, Professional Historians Association, <www.sahistorians.org.au/175/documents/hindmarsh-a-short-history.shtml> viewed 12 January 2014

³ *SA Register*, 27 July 1839, p3b

⁴ *Southern Australian*, 30 April 1840, p4a

⁵ *Southern Australian*, 7 May 1840, p4a-c

⁶ *Southern Australian*, 15 May 1840, p3a

⁷ Ron Parsons, 1974, *Hindmarsh Town: A History of the Village, District Council and Corporate Town of Hindmarsh* South Australia, Corporation of the Town of Hindmarsh, p17

It is more than probable that the depression or recession which hit the Colony around this time knocked the scheme on the head before sufficient money had been received – promises are notoriously hard to spend.

There was certainly still the intention with land in the township of Hindmarsh being advertised “at the point of the proposed bridge over the Torrens” in December 1842.⁸

The detail (right) from Light’s survey of the districts surrounding Adelaide shows the “line of road” from the Port between Thebarton and Bowden (names added).⁹ Section 353 became the township of Hindmarsh and Section 1, originally owned by Light himself, Thebarton. The River Torrens makes a distinct turn at this point before flowing due westward and there must have been an obvious crossing place here. The north-western part of what was then called South Adelaide had become the commercial district and business people had two choices to communicate with the Port: cross the river in the City and travel along the northern bank or stay on the southern bank and cross at Hindmarsh. If anything, the proposed crossing might be preferable because floods regularly destroyed the early bridges in the City.



*Detail from Colonel Light's 1839
"The District Of Adelaide, South Australia,
As Divided Into Country Sections"
[MAPCO Collection]*

5.2 Wilkin's Bridge

The need for a bridge at Hindmarsh had certainly become more obvious following the opening of the “New Port” facilities in October 1840.¹⁰ Despite the offered subscriptions, a bridge was finally constructed in 1844 through the initiative of William Wilkins, landlord of the Market House tavern, who built a “substantial bridge, made of rough logs, in the American fashion”:¹¹

... It is close to the Port Road, and will be a very great convenience to the inhabitants of Thebarton, Reed Beds, and to those on the west side of Adelaide, and will greatly improve property in that quarter. The wonder is that the step now adopted was not taken years ago.

Construction of the bridge was frustrated by the theft of a chain, 150 feet long, which had been used in the lifting tackle to handle the bridge timbers (which were clearly substantial). Wilkins offered a reward of two pounds for its return.¹² Despite this upset, the bridge was completed and its formal opening on Monday 16 December 1844 celebrated with a public dinner at the Market-house Inn.¹³ However, the project seems to have taken its toll on Wilkins who was reported to be “afflicted with a mental malady” at the time of the opening and had, in fact, been confined to gaol as a “dangerous lunatic”. Sadly he died a few days later and the attending physician was charged with manslaughter.¹⁴

Nevertheless, the bridge was known for some time afterwards as Wilkin's Bridge and its robust construction resisted the impact of floods much better than more slender structures further upstream, often providing the only crossing of the Torrens in reasonable proximity to the city. It survived the big floods of

⁸ *Southern Australian*, 27 December 1842, p3c

⁹ *The District Of Adelaide, South Australia, As Divided Into Country Sections. From The Trigonometrical Surveys Of Colonel Light, Late Survr. Genl.*, 1839, John Arrowsmith, London

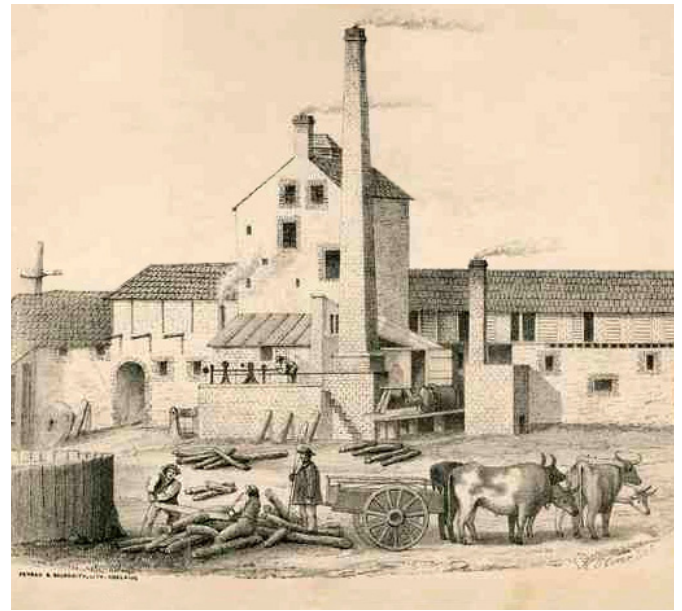
¹⁰ *SA Register*, 17 October 1840, p2aff

¹¹ *Southern Australian*, 18 October 1844, p3c

¹² *SA Register*, 2 November 1844, p2c

¹³ *South Australian*, 13 December 1844, p2a

¹⁴ *SA Register*, 18 December 1844, p3b; 25 December 1844, p3c; “The Late Mr Wilkins”, *South Australian*, 31 January 1845, p3e; “Supreme Court”, *South Australian*, 18 March 1845, pp3b-4b



*John Ridley's flour mill and Edward Crawford's brewery at Hindmarsh
[SLSA B7420 and B7955]*

1844 which swept away the little City Bridge (along with Shand's brewery on the banks of the Torrens).¹⁵ However, reports of its loss in 1846 were – like Mark Twain's death in 1897 – an exaggeration. William Dumbleton, now landlord of Wilkin's Market House tavern, told the *SA Register*:¹⁶

Not only was this bridge passable on the afternoon of the day of the late enormous flood, but it has since been, and still is, the only means of communication for heavily laden drays between Adelaide, the Port, and the northern districts. While on the subject allow me to observe that not the smallest portion of the work done to this rustic bridge by the deceased Mr Wilkins has been destroyed or even misplaced by either the late, or any of the preceding great floods, while all the others on the Torrens, erected under the direction of practical men, have been rendered useless or carried away.

In June 1847, the bridge had a narrow escape:¹⁷

Wilkin's Bridge was a yard or so under water, and this perhaps saved it, as the logs floated clearly over. The recent work is destroyed, and the road denuded of its ballast; but, in other respects, it justifies the prediction of its unfortunate founder, in having resisted the utmost fury of the floods.

But finally it succumbed the following month:¹⁸

The stout little Wilkins Bridge has gone at last. It was destroyed, as stated in our previous number; and when the river subsided, it was found to have made a clean breach — the great tree to which the bridge was made fast, having likewise been carried away.

Two local businessmen whose enterprises were on the northern side of the river – flour miller John Ridley and brewer Edward Crawford – guaranteed £80 “which they are raising by subscriptions” towards the cost of a replacement bridge and were also raising money for the temporary repair of Wilkin's Bridge.¹⁹ The Government was prepared to spend up to £500 (including the subscriptions) on the new bridge which was to be a little further downstream at a site:²⁰

... formerly selected by the first Surveyor-General, Col. Light, namely, in a direct line between the roadway at the public slaughter-house, and the great Port-road, between Hindmarsh and Bowden. The intended structure, undertaken by the Government, is to be of wood, and will be centrally supported by a row of piles driven into the bed of the river.

¹⁵ Richard Venus, 2012, “A Bridge Over Troubled Water: Crossing the River Torrens, 1836-1856”, *Inaugural South Australian Engineering Heritage Conference*, Engineers Australia, Adelaide, p45

¹⁶ *SA Register*, 5 August 1846, p4b

¹⁷ *South Australian*, 22 June 1847, p2e

¹⁸ *South Australian*, 27 July 1847, p3c

¹⁹ *South Australian*, 17 August 1847, p3e

²⁰ *SA Register*, 4 August 1847, p2e

5.3 The Thebarton Bridge

The work was not put out to tender but undertaken by the Government, presumably to a design of Edward Frome, the Colonial Engineer, who announced that it would be open to the public on Tuesday 22 August 1848.²¹ Soon after, it was closed again, eliciting the scorn of Andrew Murray, proprietor of the *South Australian* newspaper (and never a great fan of Frome).

Frome explained that the bridge:²²

... has only been shut up for completion not repair, having been opened before it was finished, in consequence of the almost impassable state of the approaches to the old bridge. The accident we referred to was caused by the shrinkage of the green timber, which was corrected in half-an-hour by screwing up the tension bars.

Murray responded:²³

On the other hand, the bridges made by Messrs Wilkins and Prescott, have, in enlargement and repairs, cost the Government between £500 and £600. ... At present we shall merely say that we gladly give the Colonial Engineer the benefit of all the facts he has stated. In the absence of correct information as to amounts, we took the value generally put upon the works. The cause must indeed be rotten which requires the aid of fiction; and we are always delighted when facts are elicited. It is clear, however, in the present case, that the facts stated by the Colonial Engineer do not affect our argument. Three bridges have been built under the superintendence of the Government, at great cost; and two, by private individuals, at a small cost. Two of the Government bridges have been swept away; and the other, the latest attempt, certainly did sink in the centre, and was shut up several days, apparently for repairs; while those by private individuals were the only bridges open for the public. The precise amount is comparatively a question of little moment. Our queries are, how came the Government bridges to be destroyed; and who is responsible for their loss?

In March 1849, Frome called tenders for “Painting and tarring Thebarton Bridge, and screwing up tension-rods thereof”.²⁴ A few weeks later the *SA Register* observed: “The new bridge at Thebarton is having its ‘understandings’ tarred, but the ‘uppers’ are left to take care of themselves.”²⁵

Being at the city end of the road to the Port, the bridge was an obvious point at which to erect a toll gate. On 17 October 1860, an “Act to authorize the levying of Tolls on the Port Road, and for other purposes” was assented to and came into force on 1 January 1861: tolls ranged from one shilling for a coach or cart drawn by one horse or two bullocks to a farthing for each sheep, hog or goat.²⁶

South Australia only had two toll roads: the Mount Barker Road (with its iconic toll house and gate) and the Port Road. According to the *South Australian Register*, the Mount Barker Road tolls “died out from their unpopularity and uselessness; and now the Port-road, after being obstructed by them for several years, has shaken off their yoke.” They were removed from 1 January 1871.²⁷

Concerns were expressed over the years about the condition of the bridge which, despite its “substantial construction” was being referred to as “rickety”. In 1878, Josiah Mitton, the Mayor of Hindmarsh, said:²⁸

... the present bridge was built more than 28 years ago, and having been made of wood was in an exceedingly dilapidated state. An enormous amount of traffic went over it, and the vibration caused by the passage of heavy drays was something dreadful. The footway was also in a dangerous state. While walking over the bridge a few nights ago he noticed that one of the boards had been shifted out of its place. He called the attention of the man who has charge of the bridge to it, and was told that it was scarcely any use nailing the boards down, as the joist was so rotten that the nails would not hold, and that the vibration loosened the planks.

²¹ *SA Register*, 19 August 1848, p3d

²² *South Australian*, 3 October 1848, p2a

²³ *Op cit*, p2ab

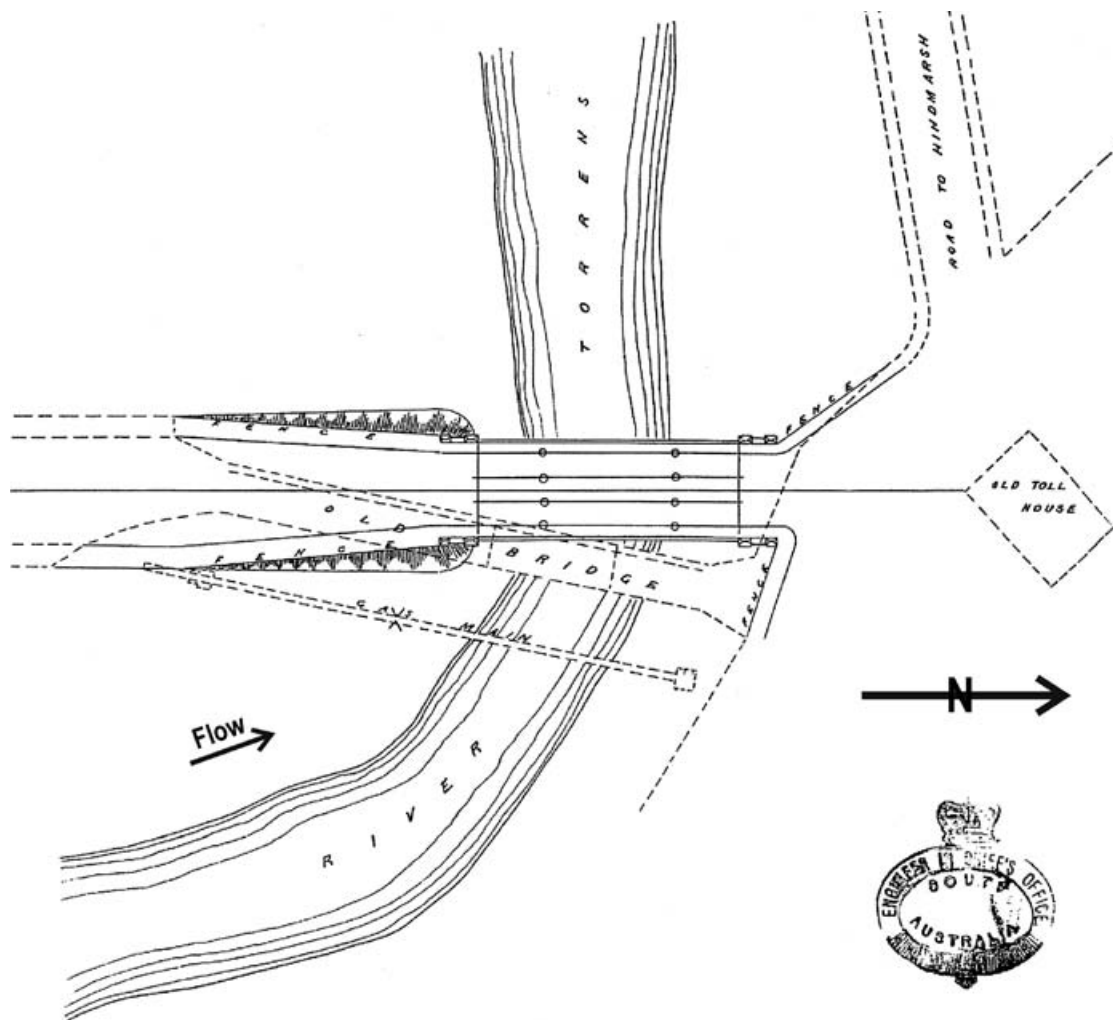
²⁴ *SA Register*, 31 March 1849, p4d

²⁵ *SA Register*, 28 April 1849, p2c

²⁶ *An Act to authorize the levying of Tolls on the Port Road, and for other purposes*, No 10 of 1860

²⁷ *SA Register*, 31 December 1870, p5a

²⁸ *SA Register*, 20 March 1878, p7c



*Plan showing location of old and new Hindmarsh Bridges, 1879
Wilkin's Bridge was further upstream (to the bottom left)
[Engineer-in-Chief's Department, Drawing No 4060/300]*

5.4 The Hindmarsh Bridge

In April 1878, a deputation from the Hindmarsh Council called upon the Commissioner of Public Works who “promised to obtain a report on the matter, and would urge upon his colleagues to place a line on the Estimates for a substantial structure”.²⁹ Plans for a bridge, dated June 1878, were drawn but were then “abandoned by order of the Engineer in Chief”. New plans were drawn early in 1879 and tenders were called for a wrought iron girder bridge with masonry abutments. Tenderers were asked to specify if the ironwork was to be made in the Colony.³⁰

In June, Davies & Wishart were announced as the lowest tenderers.³¹ This was principally due to their proposal to obtain the ironwork from England which, in turn, resulted in a “monster meeting” at the Adelaide Town Hall.

As the *South Australian Advertiser* explained:³²

It was called specially to consider the depression in the iron trade in this colony, and to urge that the manufacture of bridges and other iron work for South Australian requirements should be confined to the colony, instead of the present practice of inviting competition from all the world, or allowing contractors, if they think fit, to get the work done elsewhere than in the province. It is understood that the circumstance which really led to the meeting was the acceptance of the tender of Messrs. Wishart & Davies for erecting the bridge at Hindmarsh. Tenderers were invited to state what they would carry

²⁹ *SA Register*, 4 April 1878, p6b

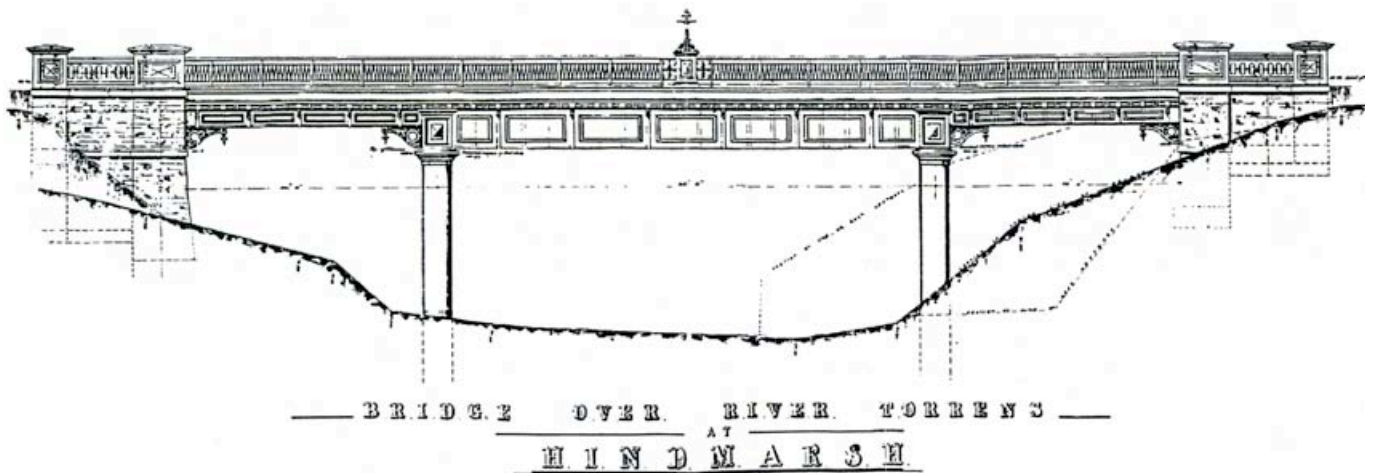
³⁰ Katrina McDougall & Elizabeth Vines, 1993, *Hindmarsh Bridge: Heritage Record*, McDougall & Vines, Norwood, p3

³¹ *SA Register*, 10 June 1879, 5e

³² *SA Advertiser*, 17 June 1879, p4de

out the undertaking for, having the work all done in the colony, and what their price would be if at liberty to import girders and other manufactured ironwork from abroad, and the difference was so greatly in favor of the tender on the latter condition that it was accepted. The Government as trustees or servants of the public could hardly do otherwise. They are not justified in spending the public money, in which all classes have an interest and to which all contribute, for the benefit of a particular trade.

Maurice Davies and John Wishart had established quite a reputation as contractors. Originally putting in rival bids to build the Adelaide Bridge, they combined forces and completed the construction in 1877.³³ They were then awarded the contract to build the replacement for the Frome Bridge, another “old and rickety” bridge. Designed by John Grainger and Henry Worsely, this bridge was opened in May 1879 and named the Albert Bridge.³⁴ Davies & Wishart began calling tenders for earthworks at Hindmarsh in July 1879³⁵ so this project followed hard on the heels of the Albert Bridge.



*Side elevation of the Hindmarsh Bridge
[Engineer-in-Chief's Department, Drawing No 4060/300]*

The new bridge had three spans, two of 30 feet and one of 60 feet, supported by eight cylindrical piers filled with concrete. The cast iron piers had been supplied by the Government and were left over from the construction of the road bridge over the River Murray at Edwards' Crossing which had been completed in March 1879 (the township there was renamed Murray Bridge in 1924).

The Murray Bridge (as it was called) was the crucial link in establishing road and rail transport between South Australia and the eastern colonies. At the time of its completion in 1879, it was described as “the largest and at the same time the most costly undertaking of the kind that has been yet erected in the Australian Colonies, including New Zealand”.³⁶ The iron work had been ordered from England in 1866 without a proper survey of the river crossing itself and the eastern approach over the wide river flats.

The piers were made of cast iron sections, assembled on site and filled with concrete. The *Register* described the process:

The main girders rest on masonry bed-stones, which are supported by the cement concrete with which the cast-iron piers are filled, the piers in each instance having been sunk down to the bed-rock granite. They are composed of cast-iron cylinders seven feet in internal diameter, fitted together in segments, and bolted in lengths as they were lowered into the river bed; and after being tested with double the weight that they would be ever required to sustain, they were filled up with cement concrete. ... The eastern approach consists of twenty-three spans of sixty feet each, making a total length of 1,380 feet. The piers consist of cast-iron cylinders in six-foot lengths, socketed together and sunk into the swamp to an average depth of about sixty feet. After being duly tested they were filled up with concrete and prepared to receive the main girders ...

³³ Venus, 2012, p54, pp56-57

³⁴ *SA Advertiser*, 8 May 1879, p5d-g

³⁵ *SA Advertiser*, 29 July 1879, p2c

³⁶ *SA Register*, 19 March 1879, p5f



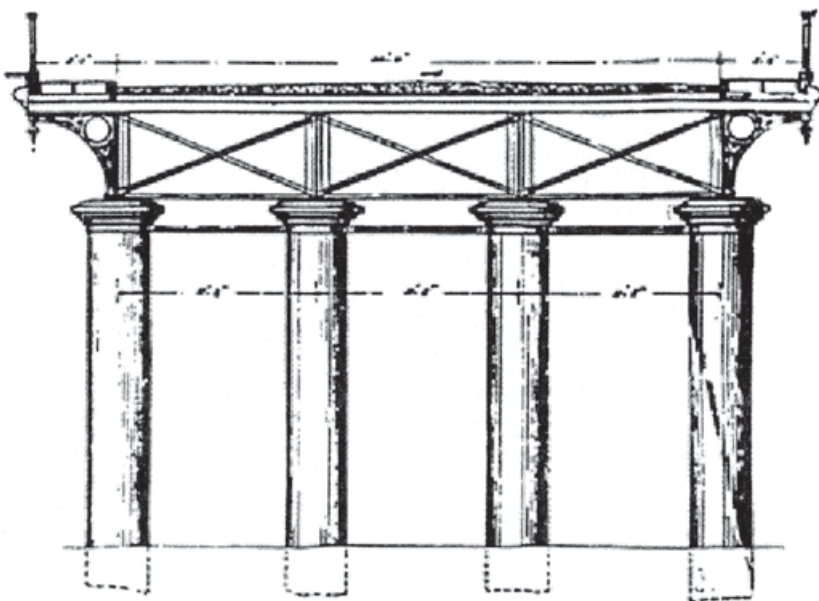
*The Murray Bridge, eastern approach showing the headstocks and cast iron piers
[Photos: Richard Venus 0241, 0248]*

The piers for the eastern approach are about 3 feet 6 inches in diameter compared to the 7 foot diameter piers used for the section across the river. The actual number of six-foot sections required for each pier varied, depending on the depth at which a firm base could be found.³⁷

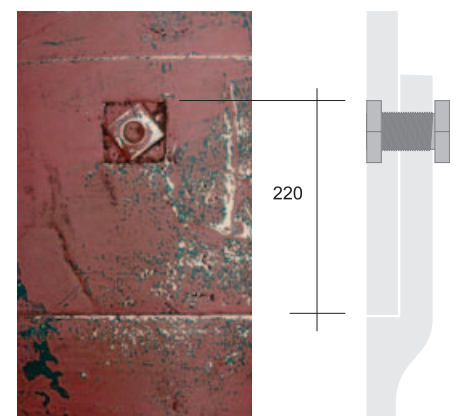
.... In a work of this kind, with an uncertain foundation, unforeseen difficulties had to be encountered, all of which were successfully surmounted by the local Superintendent, Mr. Henry Parker, who has had charge of the erection and is said to have performed his work in a most satisfactory manner.

With an average depth of sixty feet, each pier required a minimum of ten sections; there are 22 pairs of piers and Parker would have needed to have had well in excess of 440 sections on hand which is why there were a number left over after the bridge was completed.

To use the sections at Hindmarsh, the Railways Workshops at Islington cut them to the necessary length and turned a cutting edge at one end of the first sections so they could be pushed into the river bed by loading them with cast iron weights. The plate girders were rivetted together and the drawings – signed by Engineer-in-Chief, Henry Mais – show the details of fittings such as flange plate joints and cross bracing as well as a number of typically Victorian decorative embellishments. The deck was formed with wrought iron buckle plates and originally covered with wooden blocks.³⁸



*Hindmarsh Bridge – cross Section through girders
[Engineer-in-Chief's Department, Drawing No 4060/300]*



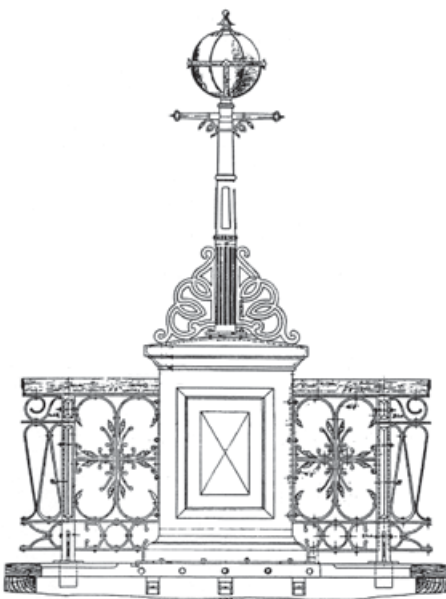
Detail of pier connections – sections slip over an internal socket and are secured by six equally-spaced one-inch bolts; the square nuts are held in place in cast-in recesses

³⁷ SA Register, 19 March 1879, p5g

³⁸ McDougall & Vines, 1993, p12



*The Hindmarsh Bridge shortly after its opening in August 1880
[State Library of SA B43193]*



[Above] The plaque marking the opening of the Hindmarsh Bridge is now on display on the northern bank [Photo: Richard Venus]

*[Left] Details of the lamp pillar
[Engineer-in-Chief's Department, Drawing No 4057/300]*

The bridge was formally opened on Saturday 14 August 1880 by the Commissioner of Public Works, George Hawker, and named the “Hindmarsh Bridge” – a point acknowledged by the Mayor of Hindmarsh, Josiah Mitton:³⁹

The old bridge had been called the Thebarton Bridge. That was a misnomer, and he was glad that when the matter was pointed out to the Commissioner by the town council he at once saw the reasonableness of naming the new structure the Hindmarsh Bridge. The town was much obliged to the Commissioner for the hearty manner in which he had met the views of the council in this respect, and on behalf of the municipality of Hindmarsh he (the mayor) publicly thanked him. (Applause.)

With the bridge opened, the Adelaide-Hindmarsh tramway could now start using it and regular services began a couple of months later. However, there was still an obstruction to the free movement of traffic.⁴⁰

³⁹ SA Advertiser, 16 August 1880, p6g

⁴⁰ SA Advertiser, 16 August 1880, p6g



*A horse tram and dray on the Hindmarsh Bridge, April 1906
[Photo: John Radcliffe NRM 23-4-06]*

In the middle of the road on the northern side of the bridge there is an obstruction in the shape of a building formerly used as a toll-house. This the inhabitants of Hindmarsh have asked the Commissioner of Public Works to get removed. The new tramway to Adelaide will pass around the building, and on the ground not merely of interference with the natural course of the traffic, but of actual danger to life, the removal of the obstruction may be fairly urged. The Commissioner has promised to call the attention of the General Board of Main Roads to the matter, and to advise them to make arrangements for the removal of the toll-house.

Given its location at the city-end of Port Road, the bridge was of critical significance not just to the local community and business people but to the City itself and, indeed, to the entire Colony. For example, when Adelaide's electric power station opened in 1901, the coal for its boilers was shipped from New South Wales and transported along Port Road and across this bridge by horse and dray.

Energy in the form of gas also crossed the Torrens, just east of and parallel to the old bridge (see plan, page 11). The gasworks were established at just west of Bowden near the railway station so that coal for the SA Gas Company's retorts could be transported from Port Adelaide by rail.⁴¹ The main gas pipeline to the city crossed the river near the bridge and over the years the bed of the river had deepened significantly. In September 1903 the Gas Company announced a proposal "to make a dam 4 ft. high across the Torrens on the western side of the Hindmarsh-bridge, with a view of causing the river to silt up so as to protect the large gas main which supplies the city with gas." That idea was abandoned because of the potential impact on the riparian rights of property owners downstream. The Gas Company then proposed to place two 17-inch steel gas mains underneath the bridge, between the girders. "When this is carried out the citizens of Adelaide will have no cause to fear a stoppage of gas," they said.⁴² This was agreed to although the Hindmarsh Council was concerned about the reduced clearance under the bridge at times of flood.⁴³

At its annual meeting in August 1904, the Gas Company reported:⁴⁴

After a great deal of negotiations, lasting over a year, they had received permission from the City Council and the corporations of Thebarton and Hindmarsh, to duplicate the main under the large bridge there. This would give them two strings to their bow. The work had not yet been completed, but the pipes required had been ordered, and were on the way from England.

⁴¹ Peter Donovan and Noreen Kirkman, 1986, *The Unquenchable Flame: The South Australia Gas Company 1861-1986*, Wakefield Press, Netley, p21

⁴² *Advertiser*, 7 October 1903, p4f

⁴³ *Advertiser*, 29 September 1903, p4g

⁴⁴ *Advertiser*, 26 August 1904, p6i

Another year passed before the work on the gas mains was actually started and this time the *Advertiser* revealed the reason for the ever-deeper river:⁴⁵

It is about 9 ft. deeper than it was 24 years ago, owing to the sand being carted away for building purposes. The Hindmarsh Corporation for some years, has derived a good deal of revenue from the sale of sand from the Torrens.

This article caused the newly-elected Member for Port Adelaide, Henry Chesson, to ask “whether the Commissioner of Public Works would instruct his officers to inspect the piers and abutments of the railway and Hindmarsh bridges over the Torrens with a view to ascertaining whether they were becoming endangered by the deepening of the river, and thus allay public fear concerning their safety.” The Commissioner said he would call for a report.⁴⁶

By the 1920s, horses were being replaced with horsepower and the 35-foot width of the Hindmarsh Bridge was proving inadequate for the growing traffic across it. A count of traffic along Port Road passing the Hindmarsh Town Hall between 4:00 and 5:00 pm one day in 1924 had revealed the following usage:⁴⁷

<i>Vehicle type</i>	<i>To the Port</i>	<i>To the City</i>
Motors	62	37
Cycles	93	157
Horse-drawn (light)	40	70
Horse-drawn (heavy)	22	24

In 1926 the Government announced plans to duplicate Port Road by building a second track on the northern side of the plantation.⁴⁸ The significance of the route had been recognised from the very foundation of the Colony by Colonel Light (although he was clearly unduly optimistic about the ease with which a road – and the associated river crossings – could be made to the Port):⁴⁹

A river runs close by the front of the Town, which in time can be made navigable... and connected with the Harbour by means of a canal and in the mean time, the places between the Town and the Harbour is so level, and destitute of any hindrance, that carriages of any description can at once be drawn, without even the trouble of making a common road, and the only thing wanted, is to construct a temporary wooden bridge over the river near the town, or perhaps half a mile from it.

As a consequence, provision was made to dig a canal along the route to connect Adelaide with its port (see map, page 8) which created an ideal transport corridor which continues to be developed to this day.

In 1926, nearly 100 years after Light’s letter, the councils north-east of the city were lobbying the Government to provide better infrastructure. However, they were reluctant to shoulder the cost themselves, pointing out that the road “was used for the carriage of merchandise which was distributed all over the State” and saying:⁵⁰

There was no other road similarly situated in regard to traffic. It was the main artery between Port Adelaide and the capital, and three-quarters of the merchandise distributed over the State was carried along it. It could not be said that the municipalities abutting on the road received any immediate benefit from the heavy traffic. The road should be treated as a national concern, and the Government should undertake to do the job.

The dust nuisance (or, in winter, mud) caused by the Port Road had long been a source of complaint. Some years before, sections had been paved with wood blocks, starting at Hindmarsh:⁵¹

The Port road has been the sepulchre of many engineering reputations. It is still the same dusty old thoroughfare, a stretch of blinding white fallow that links the metropolis to the chief seaport. Another effort is to be initiated to bring the thoroughfare into subjection and to make it a highway of dignity and usefulness.

45 *Advertiser*, 24 November 1905, p6b

46 “House of Assembly: Bridges over the Torrens”, *Register*, 25 November 1905, p10a

47 *Register*, 26 June 1924, p13d

48 *News*, 14 January 1926, p11ab

49 Letter from Colonel Light, Surveyor General, dated 9 February 1837, *SA Gazette and Colonial Register*, 3 June 1837, p6c

50 *News*, 14 January 1926, p11a

51 *Register*, 11 February 1915, p4d

This time, a new road making system would be used – bituminous concrete laid over a reinforced concrete foundation. This type of construction had been recommended by Daniel Fleming, the Engineer for Roads and Bridges, following an overseas trip in 1922 to investigate construction methods.⁵² (When Fleming was appointed to the position in 1918, one of his responsibilities was to test “the relative values of our roadmaking materials” and he started by laying down sections of different material on the Bay Road from the city to Glenelg.⁵³) One of the first to adopt the new method was the Adelaide City Council who, anticipating Fleming’s recommendations, opened a locally-made “hot mix” plant in October 1922 at its Halifax Street depot.⁵⁴ Fleming had to wait until April 1923 when the first of two plants arrived from America.⁵⁵

The announcement of the second track along Port Road was made in January 1926.⁵⁶ The Hindmarsh Bridge would now form a bottle neck and plans were drawn up to widen it by building an overhanging extension 2 feet 6 inches wide on the western side. This would be used for the footpath, allowing the 5-foot wide former footpath to become part of the roadway. In July 1926, *The Mail* reported:⁵⁷ “... no difficulty is anticipated in this matter. The superstructure can be widened without interfering with the foundations to any serious extent.”

The bridge widening would be part of a “Better Roads” program which included the duplication of the Port Road on the southern side of the bridge. As the *Register* described it:⁵⁸

The modernizing influence of motor transport is being seen not only in the rapid disappearance of horse-drawn traffic, but also in the improved surfaces which are supplanting macadam on the highways of the State.

This year the Engineer for Roads (Mr. D. V. Fleming) is particularly busy with an extensive programme of bitumenizing many roads, and the illustration in this issue of the work being carried out in duplicating the Port road gives an instance of the elaborate preparations necessary in the building of a modern and hardwearing surface which will long stand up to the requirements of traffic. In connection with this particular undertaking the existing wood blocks will, between the Squatters’ Arms and Hindmarsh Bridge, be widened to 40 ft., and thence a separate road of cement concrete foundation with asphalt top, and 20 ft. wide, will be built on the northern side of the plantation as far as the junction with the old Port road. ...

In August 1927, John McInnes, the Member for West Torrens, asked Minister of Local Government if they had considered widening the Hindmarsh Bridge. The Minister replied that the Railways Commissioner had reported:⁵⁹

... there was no danger at the point mentioned. There was ample provision for traffic, where the two roads converged. It would not be reasonably possible at the present time to make the bridge as wide as the two tracks.

Heritage consultants McDougall & Vines say the planned widening to 40 feet was completed in 1928 but note that there is no record of this work in Parliamentary Papers⁶⁰ (nor, indeed, in the newspapers).

NEW TRACK ALONG PORT ROAD

Bituminous Concrete Scheme to Cost £90,000

VIGOROUS ROAD POLICY WILL BE PURSUED

An important pronouncement regarding the policy of the Government in respect of future road construction was made today by the Premier.

He was replying to a deputation composed of representatives of local governing bodies between Port Adelaide and Adelaide which requested that an additional track should be laid down on the Port road.

Mr. Gunn promised that the work would be undertaken as speedily as possible. It would cost approximately £90,000. A vigorous policy of laying down bituminous concrete roads would be pursued.

Hon. J. M. Innes (Speaker of the House of Assembly) introduced the deputation, which consisted of representatives of the Port Adelaide City Council, Hindmarsh, and the National Roads Association. Mr. N. H. Taylor (chairman of the National Roads Association) said the age of roads had come, and traffic was being more and more taken away from the main roads. That condition of

*Announcement of the plan to widen Port Road
by building a second track
[The News, 14 January 1926, p11ab]*

⁵² *Advertiser*, 3 October 1922, p10f

⁵³ *Daily Herald*, 21 June 1918, p6f

⁵⁴ *Advertiser*, 4 October 1922, p10c

⁵⁵ *Chronicle*, 14 April 1923, p38d

⁵⁶ *News*, 14 January 1926, p11ab

⁵⁷ *The Mail*, 24 July 1926, p30c

⁵⁸ “Better Roads: Extensive Bitumenizing Programme”, *Register*, 23 October 1926, p11e

⁵⁹ *News*, 11 August 1927, p17g

⁶⁰ McDougall & Vines, 1993, p9

McInnes persisted with his requests to have the bridge widened. In August 1936 he challenged the Premier, Richard Butler, about the safety of the bridge, describing it as “a goose-neck on the most important highway in the State, and ... therefore very dangerous to users of that highway”.⁶⁵ Butler responded.⁶⁶

The Government was aware of the traffic position at Hindmarsh Bridge, but the reconstruction of the bridge was not at present considered essential. Widening of the structure would involve the widening of the roadway from the bridge to West terrace, which would entail a large expenditure.

This led to a public stoush between the State Liberal Government and the local councils (the “municipalists”) with one Hindmarsh councillor asking:⁶⁷

Why should Hindmarsh and Thebarton, because they happen to be on either side of the river, be asked to expend money on a bridge which is used 100 times more by persons from other districts whose rates we do not collect, but who pay motor taxation to the Government?

In August 1947 the Hindmarsh and Thebarton Councils again approached Daniel Fleming, now the Commissioner of Highways, about widening the bridge and the road from there into the city. Fleming replied that widening the bridge would be too expansive but that widening the roadway “would receive favorable consideration”.⁶⁸ In fact work began in January the next year⁶⁹ and, a few months later, the Highways and Local Government Department announced that plans had been prepared to widen the Hindmarsh Bridge as well.⁷⁰ The Works Minister informed McInnes that: “A start would be made as soon as steel and other materials were available.”⁷¹ This, however, was to prove a sticking point: because of the post-war problems in obtaining steel, work would not actually start on the widening for another four years.⁷² Despite this, the two Councils continued to plug away with the case for widening the bridge:



Work began in mid-1952, the Highways Commissioner telling the Hindmarsh Council in May that “much of the material” had already been delivered on-site.⁷³ The steelwork had been fabricated in Middlesbrough by Dorman Long & Co – who knew a thing or two about bridges, their earlier work including the Tyne Bridge in Newcastle (UK) in 1928 and the look-alike Sydney Harbour Bridge (1932).

This extension was on the eastern or upstream side to align the bridge with the widened roadway. This required an additional line of main girders and the necessary cross girders. The existing cross girders were

65 *News*, 31 July 1936, p4g

66 *News*, 4 August 1936, p10e

67 *News*, 6 August 1936, p22e

68 *Advertiser*, 12 August 1947, p10d

69 *News*, 8 January 1948, p8bc

70 *Advertiser*, 20 April 1948, p2g

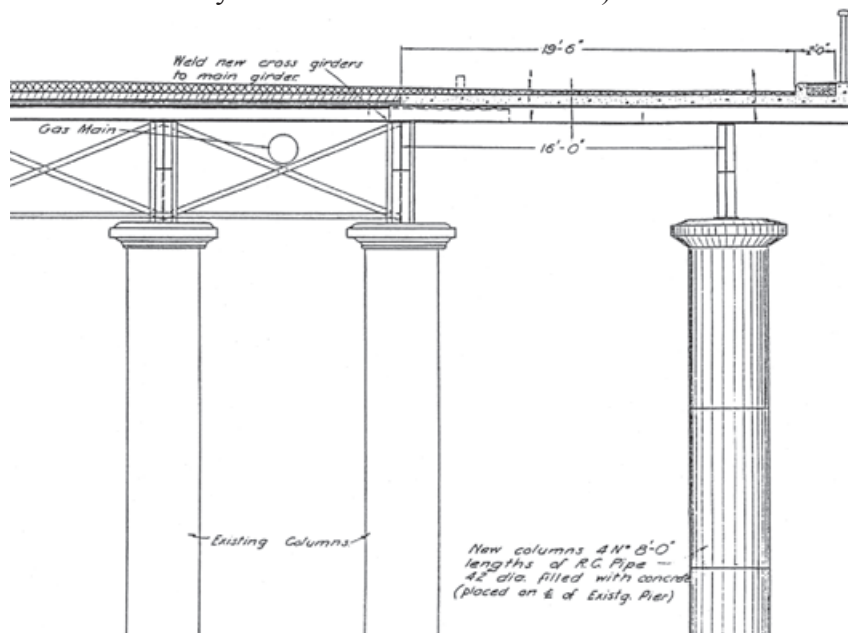
71 *News*, 22 July 1948, p4c

72 McDougall & Vines, 1993, p9

73 *The Mail*, 17 May 1952, p4a

made of iron and therefore the extensions could not be attached by simply welding them. Instead, steel plates were rivetted to the top flanges of the main girders to form bearing plates and the steel cross girders were then welded to the plates.⁷⁴

Two piers were required to support the additional main girder and these were made by stacking eight-foot sections of spun concrete pipe end-to-end, supported by spread footings and filled with reinforced concrete.⁷⁵ Although not specifically mentioned in the departmental reports, the reference to “spun concrete pipe” is a clear indication that these components were supplied by the Adelaide manufacturer Humes (the process was invented by the Hume brothers in 1910⁷⁶).

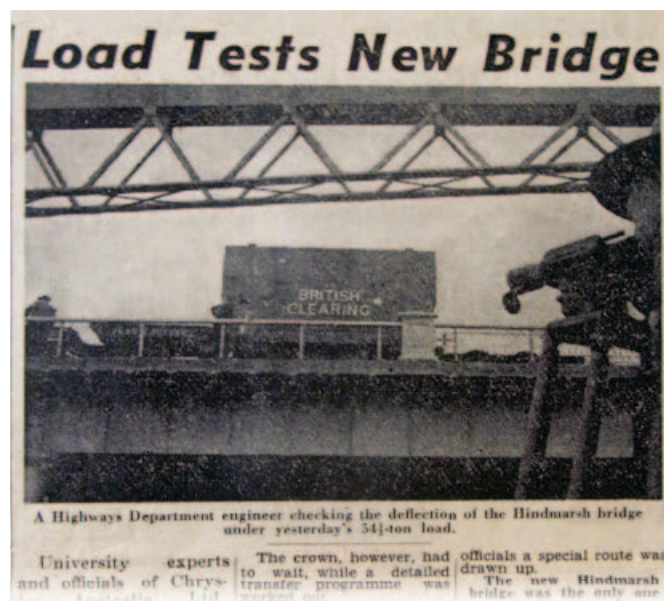


*Detail of the extension to the eastern side of the Hindmarsh Bridge
showing the additional columns required
[McDougall & Vines, 1993, p13]*

In addition to the work on the bridge, the opportunity was also taken to realign the river channel: the sheet piling protecting the banks had deteriorated and there were concerns that continued erosion might undermine the road on the southern side of the bridge. The new channel was completed in 1953 ahead of the winter rainfall.⁷⁷ Work on the bridge itself was completed in June 1954.

In the early days of bridge building, the final step was to load test the structure, usually by driving heavy vehicles such as steam rollers or traction engines over it. A few months after its completion, the widened Hindmarsh Bridge had a similar load test when a piece of machinery weighing 54½ tons was safely driven across it. The equipment was just one part of a new automotive press for the Chrysler factory at Keswick.⁷⁸

With routine maintenance from time to time, the widened bridge continued to fulfil its purpose for the next 40 years. At the time of its centenary in August 1980, it was being used by an average of 42 000 vehicles a day.⁷⁹



[Advertiser, 5 October 1954, p5c-e]

74 Highways Department (?) *Annual Report 1952-53*, p14

75 Highways Department (?) *Annual Report 1951-52*, p13

76 *Humes Concrete Pipes: 100 Years 1910-2010*, Humes Limited, 2010

77 *The Mail*, 10 January 1953, p47c

78 *News*, 4 October 1954, p7bc

79 McDougall & Vines, 1993, p11

McDougall and Vines note that the Hindmarsh Bridge was considered a “handsome” addition to the landscape of the River Torrens:⁸⁰

As only one of two iron girder bridges with deck beams, full support girders and cross bracing supported on cast iron piers in South Australia, the Hindmarsh Bridge in its original form had considerable engineering significance. The basic structure of the bridge has remained intact, although widening and other alterations have been undertaken over time which has compromised the appearance of the bridge.

The structure of the Hindmarsh Bridge was similar to that of the Albert Bridge which had been built by the same contractors although it is not clear who actually designed the bridge and which English firm fabricated the ironwork. However, the two major widening projects and various repairs and replacements had changed its appearance quite markedly. All of the wonderful decorative panels had been removed (probably when the bridge was widened) and the ornate lamp posts had been taken down in 1952.⁸¹

In 1989, load and capacity testing by the Department of Road Transport showed that the bridge was being subjected to stresses significantly above allowable levels.⁸²

A number of options were considered:⁸³

- Historically and now, it was a critical crossing in a major arterial road and was used by a significant number of heavy vehicles: reducing the load limit or the number of lanes would be counter-productive.
- Strengthening of the bridge would require significant alterations to the structure which would compromise its heritage value. There was also insufficient information available about the foundations of the bridge for the necessary design work.

The inevitable conclusion was that the bridge had to be demolished and replaced with a new structure able to carry traffic for the foreseeable future. At that time, the bridge was listed on the Register of the National Estate and the Australian Heritage Commission had to be informed of the decision.

5.5 Demolition and Interpretation of the Hindmarsh Bridge

The report by heritage consultants Katrina McDougall and Elizabeth Vines, in association with consulting engineer Hugh Orr from B C Tonkin & Associates,⁸⁴ made suggestions for various forms of interpretation on the site and the reuse of materials. The bridge is adjacent the Southwark Brewery and the area is popular with tourists and visitors because of the Brewery’s attractive riverbank gardens and Christmas display. The location was therefore ideal to tell the story of this significant crossing and its bridges.

Three plinths were constructed using dressed sandstone blocks from the abutments. One displayed the commemorative marble stone from the 1880 opening of the bridge (see page 14) and another a bronze plaque (subsequently stolen, presumably for its metal value) for the opening of the new bridge. The top sections of four of the cast iron piers were embedded in the river bank with the pier heads or headstocks, where the main girders met, clearly visible.

There was also a proposal to build a footbridge further downstream using some of the materials such as the wrought iron balustrade panels, the abutment stones, the hand railing, and one or two of the main girders; however, nothing eventuated.



*Headstocks of the old Hindmarsh Bridge
[Photo: Richard Venus 1676, March 2014]*

⁸⁰ McDougall & Vines, 1993, p17

⁸¹ *Op cit*, p15

⁸² *Op cit*, p30

⁸³ *Ibid*

⁸⁴ Hugh was also a member of the SA Division’s Engineering Heritage & History Group



*Interpretation at Hindmarsh Bridge with top sections of piers displayed behind –
note the plaque missing from the centre plinth
[Photo: Richard Venus 1659, March 2014]*

York Civil Pty Ltd commenced demolition of the bridge on 18 October 1995; the demolition and removal of salvaged material was completed on 1 December. In accordance with the recommendations of the heritage report, the Department of Road Transport had a detailed photographic record made. Components, from the massive girders to the individual rivets, were also examined for historical information about the structure or their manufacture. Items of interest included:⁸⁵

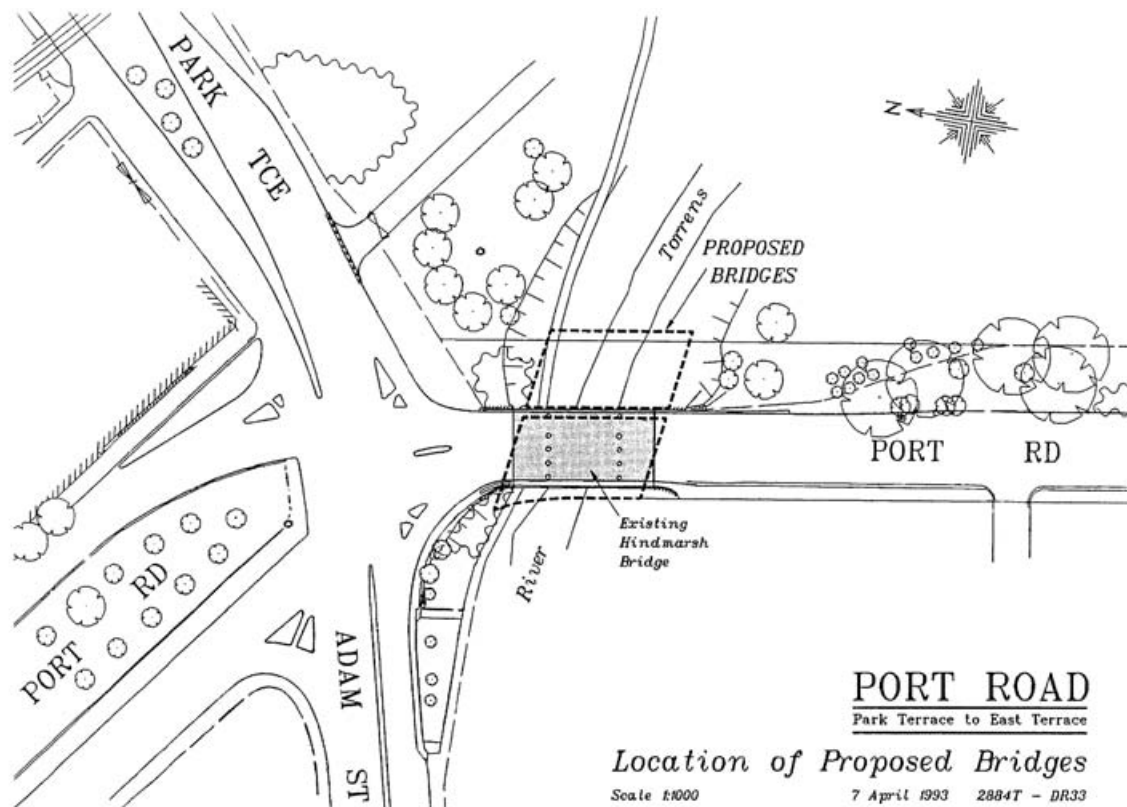
- Each wrought iron balustrade panel had been identified by a Roman numeral from I to XX
- The name of Dorman Long & Co was clearly marked on a number of sections from the 1952 extension
- No makers marks could be found on any of the original iron or stone work
- Analysis of the paint layers showed a base coat of bitumen which was applied on site followed by red lead primer and a top coat of brown (Australian Standard colour X55⁸⁶); the bridge was later painted a red oxide colour (AS colour R63) and later still a metallic Silverfrost colour
- A 1954 newspaper, sheets of which were found on the undersides of the precast concrete pavings slabs of the western footpath



*Flood at Hindmarsh Bridge, 1917
[State Library SA, B28169]*

⁸⁵ John Dallwitz, 1996, *The Demolition of Hindmarsh Bridge: Photographic Record*, Department of Road Transport, Adelaide

⁸⁶ Australian Standard AS2700 *Colour Standards for General Purposes*:
see examples at www.duluxprotectivecoatings.com.au/colour-as2700.html



*Draft Proposal for New Bridges on Port Road, Department of Road Transport
[McDougall & Vines, 1993, p39]*

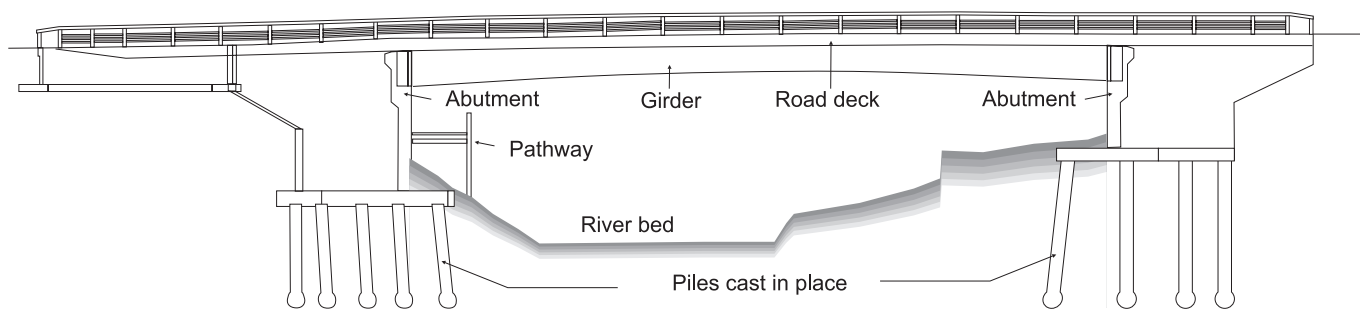
5.6 The New Hindmarsh Bridge

The new bridge was designed by the Structural Services Section of Transport SA, the State's Road Transport Agency. It would be in two sections – the first would be constructed on the eastern side of the old bridge which could then be demolished and replaced with the second section (see plan above). The road to the south into Adelaide would also be widened.

Each section was supported by ten steel girder beams resting on new abutments. Each girder spanned 35.5 metres and was 1.8 metres deep at the ends. The bottoms of the girders were given a slight upward curve to give the bridge a pleasing appearance. They weighed 23 tonnes and rested on reinforced concrete

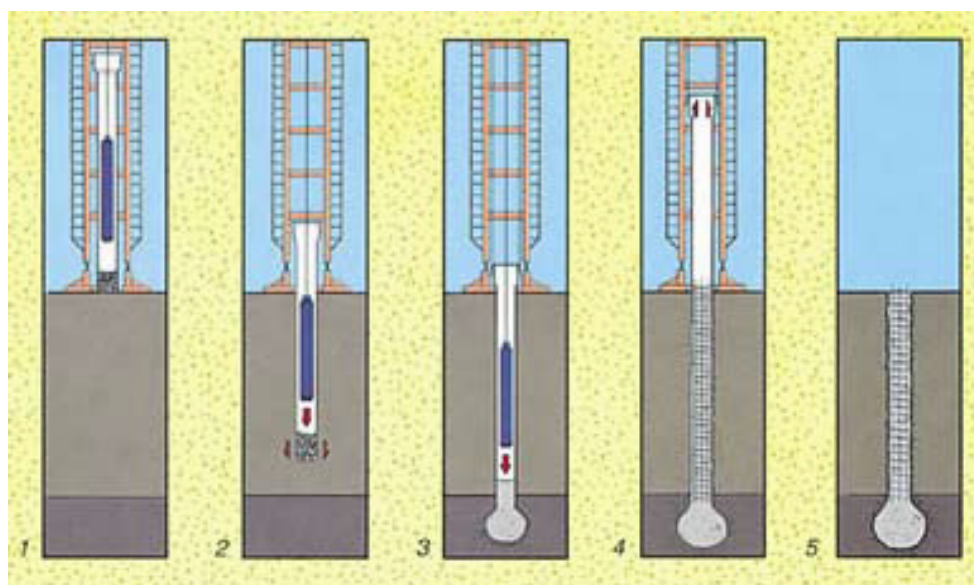


*Concept drawing of the proposed Hindmarsh Bridge
[Department of Road Transport]*



*Concept drawing of the proposed Hindmarsh Bridge
[Department of Road Transport]*

abutments faced with sandstone from the Flinders Ranges (the sandstone for the previous bridge came from Teatree Gully⁸⁷). The abutments, in turn, were supported on 101 concrete piles cast *in situ*, some up to 7 metres deep. The drawings show the enlarged base which are typical of the Franki Pile cast-in-place displacement pile invented by Edgard Frankignoul in 1909.⁸⁸



*The Franki Pile installation process
[Franki Piles information sheet, Frankipile Australia]*

York Civil were the successful tenders for the construction and they started on the eastern section in February 1995. Work proceeded quickly: once the abutments were completed, the prefabricated girders were lifted into place and the road deck was installed. Traffic was transferred to this section, which had five lanes, on 15 October 1995.⁸⁹ Demolition of the old bridge (already described) then took place with the site being cleared by 1 December 1995. The second section, also with five lanes, was then constructed and the completed bridge was formally opened on 11 November 1996. Since then, there have been several alterations to the number and arrangement of lanes to provide for bicycle and left turn slip lanes.



*Plaque commemorating the 1996 opening of the new Hindmarsh Bridge
[Photo: Department of Planning Transport and Infrastructure]*

⁸⁷ *SA Advertiser*, 16 August 1880, p7g

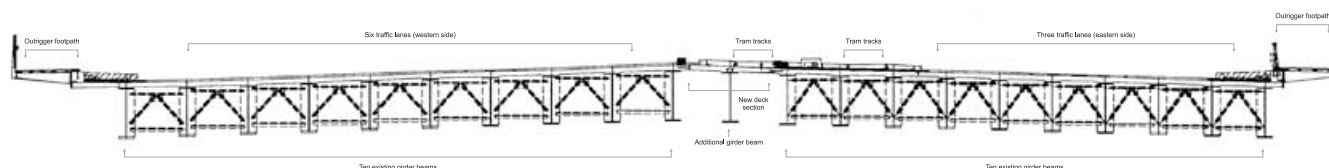
⁸⁸ "Company", 2014, *Franki* website, Frankipile Australia, < www.franki.com.au/company.htm > viewed 23 November 2014

⁸⁹ "New bridge danger to cyclists, MP claims", *Advertiser*, 16 October 1995, p5f



Awards presented to the Department of Transport in 1997 and 1998 for the Hindmarsh Bridge [Road Transport Agency]

The steel was supplied by BHP and the fabrication was carried out by local firm, Perry Engineering. The bridge was opened by Diana Laidlaw, the Minister for Transport, on 11 November 1996. In the following years, the bridge was recognised with a Certificate of Commendation from the Civic Trust of South Australia (Category 3: Landscape & Streetscape) and a Merit Award in the 1998 Australasian Steel Bridge Awards.



Section showing modifications to bridge to accommodate tramline extension (hatched sections show where footpaths were removed) [Road Transport Agency, Drawing No 1-5895, sheet 53]

5.7 Trams to Hindmarsh (Again)

In 2005, 50 years after trams were removed from the streets of Adelaide, the State Government announced that the one line remaining – the City-Glenelg tram which ran, for the most part, on its own right-of-way – would be extended through the city to the north-west corner. This was a step towards fulfilling the vision of a “Coast to Coast” light rail network (albeit one that left the coast at one point and returned to it at another). The first 1.6 kilometre of track was laid in 2007 and the line opened to the public on 14 October 2007. In April 2009, work started on the next stage – a 2.8 kilometre extension from North Terrace and along Port Road to Hindmarsh; here, a Park and Ride facility would be established in the car park of the Adelaide Entertainment Centre.⁹⁰ Almost all of the line would follow the route taken by the horse trams of the late 19th century and cross the Torrens at the same point.

The river crossing necessitated alterations to the bridge. An additional girder beam was installed between the two bridges to support a new concrete deck slab and the footpaths were removed and replaced with new pathways supported by outrigger brackets (see section drawing, above). This strategy of supporting the footpath outside the bridge was the same as that adopted for the first widening of the previous bridge in 1928 (see pages 17-18). This extension to the tramline opened on 22 March 2010.⁹¹

⁹⁰ *Coast to Coast Light Rail*, Department for Transport, Energy and Infrastructure brochure, April 2009, p2

⁹¹ “Coast to Coast Light Rail”, *Department for Transport, Energy and Infrastructure website*, <www.infrastructure.sa.gov.au/coast_to_coast_lightrail>, viewed 8 October 2014



Port Road in about 1920 [SLSA PRG 1316/6/89]



One of the last horse trams on Port Road: the line has been electrified so the photo would have been taken just before 3 April 1917

[SLSA PRG 1316/6/87]



A Bombardier Flexity tram at the Entertainment Centre terminus

When the third Hindmarsh Bridge opened in 1880, a horse tram service could be operating from the city to Hindmarsh along Port Road; with the completion of this extension in 2010, trams once again crossed the Hindmarsh Bridge [Photo: Richard Venus, September 2014 Flexity_9936]

6. The People

6.1 Edward Frome, RE FRAS, MICE

Edward Charles Frome, the Colonial Engineer, was born on 7 January 1802 at Gibraltar. He was educated in England and, aged 15, entered the Royal Military Academy, Woolwich. He received his commission in the Royal Engineers in 1825 and served on the construction of the Rideau Canal in Canada in 1827-33. Holding the rank of lieutenant, he was the superintendent of instruction of junior Royal Engineers at Chatham where he wrote a book on trigonometric surveying which became a standard text book for many years.⁹²

The South Australian colonisation commissioners appointed Frome as Surveyor-General of South Australia for ten years, following Colonel William Light who had resigned in January 1838.⁹³ Frome arrived in Adelaide in the *Recovery* with his wife, their three children, and a party of sappers and miners “for the assistance of the survey department” in September 1839.⁹⁴ There was some confusion because the local administration has already offered the post to noted explorer Charles Sturt. Lieutenant-Governor George Gawler appointed Sturt Assistant Commissioner of Lands, albeit at reduced salary. Sturt later became Colonial Treasurer and Colonial Secretary.⁹⁵



Edward Charles Frome
[State Library SA B6189]

Frome took on the duties of Colonial Engineer without additional pay and designed several bridges, including the Thebarton Bridge. In August 1842 a timber bridge across the Torrens (in line with Pulteney Street) was opened and named the Frome Bridge in his honour.⁹⁶

Frome left South Australia in 1849 at the expiry of his term and continued to serve with the Royal Engineers. From 1851 to 1858 he was Surveyor-General for the Island of Mauritius and Commanding Royal Engineer for Ireland in 1859 and for Gibraltar in 1863. His next appointment was Inspector-General of Fortifications and Commandant of the Corps of Royal Engineers in 1868. In 1869 he was Lieutenant Governor of Guernsey. He retired in 1877 with the rank of General.⁹⁷ Frome died on 12 February 1890.

6.2 Maurice Davies & John Wishart – bridge-building contractors

Davies and Wishart started their successful career as rival tenderers for the Adelaide Bridge in 1875. Originally the Adelaide City Council accepted Davies’ bid of £10 900 for the erection of the new City Bridge; Wishart wasn’t far behind him at £11 500.⁹⁸ Davies was a businessman who saw a commercial

92 H J Gibbney, ‘Sturt, Charles (1795–1869)’, *Australian Dictionary of Biography*, National Centre of Biography, Australian National University, <adb.anu.edu.au/biography/sturt-charles-2712/text3811>, published in hardcopy 1967, viewed 6 September 2014

93 *SA Gazette and Colonial Register*, 20 January 1838, p1a

94 *SA Register*, 21 September 1839, p4d

95 Gibbney, 1967

96 *Southern Australian*, 19 August 1842, p3e

97 Denis Cumming and Gwen Moxham, 1986, *They Built South Australia: Engineers, Technicians, Manufacturers, Contractors and Their Work*, self published, Adelaide, pp66

98 *SA Register*, 6 July 1875, p5b

opportunity in the project but needed others to provide the technical expertise. The wrought iron plate girder bridge was fabricated in England and the components were inspected there by a supervising engineer engaged by the South Australian Government. The City Surveyor supervised the erection which was managed by John Wishart. The bridge was opened on 26 April 1877. However, the *Register* noted:⁹⁹

The contractor for the bridge, Mr. M. C. Davies, is entitled to the utmost credit for the manner in which he has fulfilled his obligations, and it is rather a strange omission that his name should not have been inscribed with the others on the memorial plates which have been affixed to the bridge.

Davies and Wishart then worked jointly on a number of projects, the next being the Albert Bridge further upstream which carried Frome Road across the Torrens. This time, the two contractors were duly recognised on a plaque when the bridge was opened on 7 May 1879.¹⁰⁰

Charles Sutherland Baillie joined the partners and the group became known as Baillie, Wishart & Davies. A carpenter and joiner by trade, Baillie and his brothers had secured road and bridge building contracts in Western Victoria, in the vicinity of Portland, and the South-East of South Australia. (An uncorroborated story was that Peter Lalor, after being shot at the Eureka Stockade, made his way to Melbourne and was hidden for a while in the brothers' Flinders Street workshop.¹⁰¹)



*Plaque on the Albert Bridge
[Photo: Richard Venus 0465]*

Baillie travelled to Victoria on behalf of the group and tendered for the Princes Bridge which had been designed by John Grainger, designer of the Albert Bridge. He was unsuccessful but did secure other work for the partnership. Baillie died in Adelaide on 30 October 1911, aged 85.¹⁰²

The iron bridge at Thebarton was the next to be constructed by Davies and Wishart and an impressive list of projects followed.¹⁰³

A long list of important public undertakings were entrusted personally to Mr. Davies, and to the firm as a whole. They included the second section of the railway line to Melbourne (Mount Lofty to Nairne), the Morphett Street Railway Bridge, Largs Railway and Pier, the Grange Railway, the Port Adelaide swinging bridge, and the Hindmarsh and Albert Bridges over the Torrens. In Victoria the firm built the Watts River aqueduct, in New South Wales the noted Stephens Creek Reservoir at the Barrier, and in Western Australia the Albany and Fremantle Piers and the Cape Leeuwin Lighthouse.

Maurice Coleman Davies was born in London on 24 September 1835. His family migrated to Australia when he was about five years old and took up farming in Van Diemen's Land. In 1851 they joined the gold rush to the Victorian gold fields. The 21-year-old Davies then moved to South Australia in 1856, setting up business as a supplier of building materials.

By 1867 he was well established as a general commission agent and merchant in Adelaide, specialising in the supply of timber to the railway and construction industries. This required him to source supplies of quality hardwoods which are not found in South Australia. (As a consequence, South Australia developed laminated timber bridge construction and the Stobie pole for electricity distribution.) The search took Davies to Western Australia and he moved there in 1875¹⁰⁴ – another reason for needing someone like Wishart to manage the contract for the Adelaide Bridge.

⁹⁹ "Opening of the Adelaide Bridge", *SA Register*, 26 April 1877, p6g-7a

¹⁰⁰ "Opening of the Albert Bridge", *SA Register*, 8 May 1877, supp p1a

¹⁰¹ "A Eureka Reminiscence", *Register*, 3 November 1911, p9i

¹⁰² *Register*, 2 November 1911, p6h

¹⁰³ *SA Register*, 12 May 1913, p6g

¹⁰⁴

In 1878 Davies secured rights to a large section of native jarrah forest near Bunbury where he erected sawmills and began exporting timber to other colonies and overseas. Four years later he expanded his operations into the karri forests near Margaret River and founded the town of Karridale. To ship his timber, Davies built railway lines to the coast where he established ports and built jetties. By 1890 the M C Davies Company was responsible for nearly a third of the timber exported from Western Australia.¹⁰⁵

Davies' six sons joined the company which continued to flourish and expand. In 1897, Davies floated a public company in London, the M C Davies Karri and Jarrah Company Ltd. Within a few years, the timber business had become so fiercely competitive that in 1902 Davies merged with seven other companies¹⁰⁶ under the name of Millar's Karri and Jarrah Company (which had also been floated in 1897¹⁰⁷). Davies retired soon after the amalgamation and concentrated on his pastoral interests. He died in Perth on 10 May 1913, aged 78.¹⁰⁸

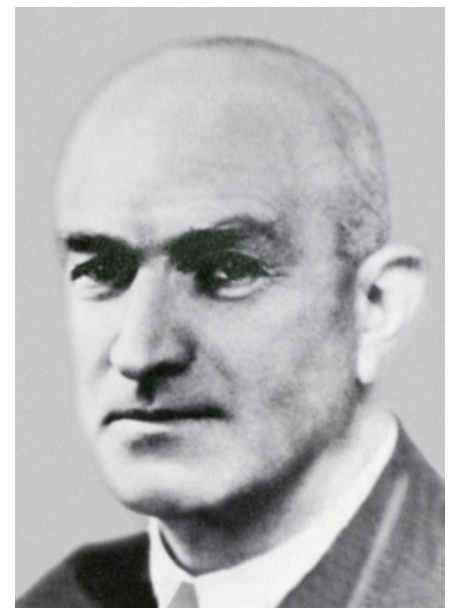
John Wishart was born in the Orkney Islands in 1835 and, at the age of 16, was apprenticed for four years to a shipbuilder. In 1855 he left home for Liverpool where he shipped as carpenter. He arrived in Victoria in 1857 where he found employment and married in 1860. He came to South Australia in March 1865 and constructed a number of important wharf and jetty projects. While constructing a wharf at Port Adelaide in 1870, his right arm was crushed by the monkey of the pile driving machine and had to be amputated.¹⁰⁹ He didn't let this stop him and he continued to work, winning many contracts for the construction or extension of jetties along the South Australian coastline. While completing an extension to the jetty at Granite Island in 1872, he was caught between two trucks, breaking some ribs.¹¹⁰ He even returned to his nemesis, Port Adelaide, in 1878 to rebuild the Old Queen's Wharf using Western Australian jarrah, no doubt supplied by Maurice Davies.¹¹¹

Despite his residence in another colony, Davies continued to win contracts in South Australia. In October 1879, Wishart secured a contract to erect beacon lights in the Port River and Davies had the contract to install the gas pipes.¹¹²

In 1901, Wishart went to Fiji as contractor for the Suva wharf¹¹³ and continued as J Wishart & Sons, a business he had set up in 1889.¹¹⁴ In 1906, while being driven to his office in Suva, the sulky he was travelling in was overturned and he suffered serious head injuries. He died on 21 July 1906, aged 71.¹¹⁵

6.3 Daniel Fleming, OBE, MIEAust

Daniel Victor Fleming was born in Ballarat on 23 September 1884 and attended the Ballarat School of Mines where he completed a diploma in engineering. He gained practical experience in quarrying and road construction in shire councils in Victoria. In 1903 he joined the South Australian Roads and Bridges Department and was appointed assistant engineer in 1915. In this role he designed and supervised the erection of many new bridges, chiefly of reinforced concrete. He was placed in charge of the technical operation of the department in February 1917 and successfully completed the woodblocking of the Adelaide-Port Adelaide main road, a project which had seen his departmental head suspended the previous year.¹¹⁶



*Daniel Fleming
[Cumming & Moxham, p61]*

105 Bruce Hamling, 1969, "Maurice Coleman Davies", *Early Days*, journal of the Royal Western Australian Historical Society, Perth, Vol 6 No 8, pp39-53

106 "Amalgamation of Jarrah Wood Companies", *Sydney Morning Herald*, 16 July 1902, p7f

107 *West Australian*, 12 May 1897, p5c; the former South Australian Governor, the Earl of Kintore, was one of the directors

108 *SA Register*, 12 May 1913, p6g

109 *SA Register*, 4 August 1870, p4e

110 *Southern Argus*, 22 November 1872, p3c

111 *SA Register*, 29 June 1878, p5b

112 *SA Register*, 24 October 1879, p5b

113 "Our Fiji Letter", *Sydney Morning Herald*, 29 June 1901, p4b

114 J Wishart and Sons purchased land at Yaranyacka, near Tumby Bay on Eyre Peninsula [*Adelaide Observer*, 31 August 1889, p10d]

115 *Register*, 4 August 1906, p6h

116 "Government Officer Suspended", *Register*, 22 December 1916, p5a

Fleming was appointed Engineer for Roads and Bridges in June 1918. Many bridges erected in the early days of the Colony required replacing with up-to-date methods and Fleming was expected to supply the designs and supervise the work. In addition, his services and advice were sought by councils in dealing with road drainage and construction. Fleming was given responsibility for experimental tests of various roadmaking materials, in order to prove their respective values.¹¹⁷

In 1922 Fleming was appointed as Director of the Local Government Department¹¹⁸ and in 1925 he was appointed the first Commissioner of Highways and held this position until he retired in 1949.¹¹⁹ He was awarded an OBE in the Civil Division in 1942.¹²⁰ The bridge at Old Noarlunga is named after him.

Fleming was a foundation member of the Institution of Engineers Australia and chairman of the South Australian Division in 1926.¹²¹ He died on 1 August 1962 at his home in Toorak Gardens.

6.4 Perry Engineering – fabricators of the steelwork for the 1996 bridge

Perry Engineering had its origins in 1898 when Samuel (Sam) Perry took over George Alexander's foundry and ironworks in Hindley Street. Perry had come to South Australia as a 22-year-old tradesman and worked for a while at Gawler and then Port Adelaide before travelling to Victoria. He worked at the Braybrook Implement Works and then for John Banks and Son's Bourke Street foundry and ironworks where he became foreman. He was only visiting Adelaide to see his brother, a Methodist minister, but saw an opportunity in acquiring Alexander's business.¹²²

Alexander was just one of several proprietors of what was one of Adelaide's oldest engineering businesses on that site. It had been established in 1848 by William Pybus and had been managed in turn by his son and then others and rejoiced in various names including the Victoria Foundry and the Tubal Cain Ironworks. James Wedlock, the proprietor before Alexander, had changed the name from Victoria to Cornwall and Perry also adopted this name.¹²³

One of Perry's first big contracts was the iron fencing around Prince Alfred College.¹²⁴ Perry soon outgrew the limited space in Hindley Street and in 1912 moved to a four acre greenfield site at Mile End, west of the city and adjacent the railway yards. In 1915 Perry took over the Gawler works of James Martin & Co. The combined sites employed 500 men and enabled them to take on large scale projects ranging from structural steel to locomotives.¹²⁵

When Sam Perry died in 1930, aged 65, the privately-owned company passed into the control of his nephew, Frank Perry, who successfully steered the business through the Depression and war years. Then, in 1947, he decided to make Perry a public company and several mining companies purchased 30% of the shares. In 1956 Don Laidlaw joined Perry and was instrumental in taking the company back into structural steelwork. They also started making mechanical presses for the then-booming automotive industry. Ten years later the construction and manufacturing boom started to taper off in South Australia and in 1966 Perry Engineering merged with the Melbourne-based engineering and lift company, Johns and Waygood. In 1986 the company, then called Johns Perry, was acquired by Boral.¹²⁶



Samuel Perry
[Chronicle, 27 March 1930, p56b]

117 "Mr D V Fleming New Engineer", *Daily Herald*, 21 June 1918, p6f

118 *Register*, 9 February 1927, p7d

119 *Bunyip (Gawler)*, 28 August 1925, p3a

120 *News*, 25 March 1942, p3e; the award was actually part of the King's Birthday Honours 1941

121 Denis Cumming and Gwen Moxham, 1986, *They Built South Australia: Engineers, Technicians, Manufacturers, Contractors and Their Work*, self published, Adelaide, pp61a-62b

122 "Builder of Industry", *The Mail*, 3 February 1923, p2de

123 Geoffrey Needham & Daryl Thomson, 1998, *Men of Metal: A chronicle of the metal casting industry in South Australia 1836-1998*, self published, Adelaide, pp3-4

124 *Advertiser*, 30 August 1904, p6d

125 *The Mail*, 3 February 1923, p2de

126 "Johns Perry Limited", *Boral* website, <www.boral.com.au/history/Ch5_10.html> viewed 5 December 2014

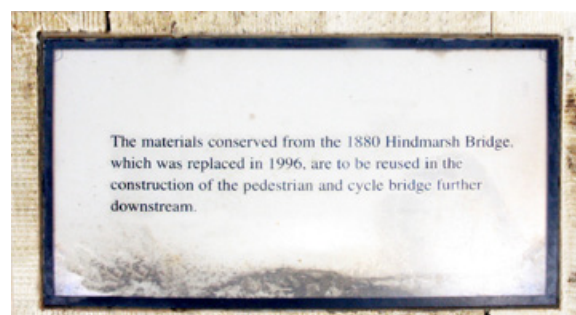
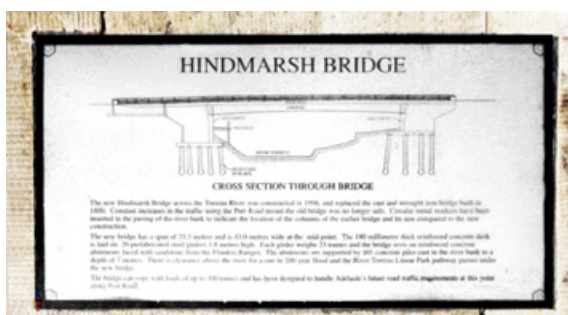
7. Interpretation Plan



Concept for Port Road Bridge interpretation at Hindmarsh

The key to the interpretation proposed for the Port Road Bridge is the existing display created in 1996 when the new bridge was opened. The top sections of four of the cast iron piers were embedded in the river bank with the pier heads or headstocks, where the main girders met, clearly visible. Three plinths were constructed with sandstone salvaged from the abutments of the old bridge. One displayed the commemorative marble stone from the 1880 opening of the bridge and another a bronze plaque (subsequently stolen, presumably for its metal value) for the opening of the new bridge on 11 November 1996. The fact that there was nothing on the face of the third plinth was the inspiration for this proposal.

Information panels were placed on top of each plinth. The etched aluminium panels are covered by acrylic sheets; although there is some water staining, these are in remarkably good condition. Unfortunately, the interpretation falls far short of current standards (and one predicts an outcome which didn't eventuate).



Existing interpretation panels

At a site meeting with representatives of the City of Charles Sturt, mention was made of possible plans to redevelop the river bank. They would also like to redo the interpretation. However, there is no funding available for such a scheme, nor is there likely to be any in the foreseeable future. They therefore have no further direct interest in the nomination but are happy for us to proceed, as indicated in an email from the Cultural Heritage Project Officer:

The bridge does not belong to the City of Charles Sturt, therefore there is no need for us to present a report to council on it being nominated for engineering heritage recognition. As you've already indicated that DPTI are happy with the proposal, this means that you can go ahead with the nomination.

Once the nomination has been accepted, we are happy for you to go ahead and install the required plaques. Again because this can be done under your own resources, we do not need to be involved, other than advising us as to when this will be taking place.

7.1 Interpretation Themes

The text of the three information panels follows. The dates given refer to the years of completion rather than actual construction. The proposed pedestrian and cycling bridge was never constructed: its function has been achieved by the reconstruction and reopening of the Sir William Goodman Bridge in 2014.

HINDMARSH BRIDGE

The Hindmarsh Bridge across the River Torrens has always been an important element linking the city of Adelaide with the Port and the suburbs to the north and west. There has been a bridge at this point since 1839, and the first bridges were built of timber.

The bridge constructed in 1880 was an elegant cast and wrought iron structure with a span of 120 feet (36.6 m). It was divided into three sections and supported on two rows of four cast iron columns. The road across the bridge was 33 feet (10.75 metres) wide and on each side there was a 5 foot (1.5 metre) footpath. The abutments and approaches at each end were constructed of Tea Tree Gully sandstone.

The bridge had to be widened twice; first in 1926 to accommodate extra traffic from motor cars, and then again in 1952, when an extra 12 feet (5.25 metres) was added upstream using concrete support columns.

Traffic on Port Road has continued to increase, and the strength of the old bridge was tested and found wanting. It was dismantled in 1996 and a new bridge was constructed in its place. The original location of the columns of the 1880 bridge can be seen in the paving of the river bank under the new bridge.

HINDMARSH BRIDGE

CROSS SECTION THROUGH BRIDGE

The new Hindmarsh Bridge across the River Torrens was constructed in 1996, and replaced the cast and wrought iron bridge built in 1880. Constant increases in the traffic using the Port Road meant the old bridge was no longer safe. Circular metal markers have been inserted in the paving of the river bank to indicate the location of the columns of the earlier bridge and its size compared to the new construction.

The new bridge has a span of 35.5 metres and is 43.0 metres wide at the mid point. The 180 millimetre thick concrete deck is laid on 20 prefabricated steel girders 1.8 metres high. Each girder weighs 23 tonnes and the bridge rests on reinforced concrete abutments faced with sandstone from the Flinders Ranges. The abutments are supported by 101 concrete piles cast in the river bank to a depth of 7 metres. There is clearance above the river for a one in 200 year flood and the River Torrens Linear Park pathway passes underneath the new bridge.

The bridge can cope with loads of up to 400 tonnes and has been designed to handle Adelaide's future traffic requirements at this point along Port Road.

The materials conserved from the 1880 Hindmarsh Bridge, which was replaced in 1996, are to be used in the construction of the pedestrian and cycle bridge further downstream.



*Circular disks on the southern bank mark the location of the piers of the 1880 bridge
[Photo: Richard Venus 1681, March 2014]*

A draft mini-panel was prepared in the event that the Council would consider replacing the rudimentary and now misleading third panel. However, in the absence of funding support, the existing interpretation will have to suffice. It should be noted that the City of Charles Sturt has already made a significant commitment to heritage interpretation in the area with the installation of Markers and interpretive panels recognising the Monash-designed Sir William Goodman Bridge and the Ridley Stripper.

In addition, the Department of Planning Transport and Infrastructure (DPTI) has accepted our suggestion and will replace the stolen brass plaque placed in 1996 with a vitreous enamel replica manufactured by Glassmetal Industries (see drawings, page 34). Taking into account the other engineering heritage interpretation in the area, we consider this a very satisfactory outcome.

THE PORT ROAD CROSSING

Wilkins' Bridge 1844-1847

The Opening of the New Bridge, near Thebarton.
WILL be celebrated by a Public Dinner, on Monday the 16th instant, at 4 o'clock, p.m., at the Market-house Inn, kept by W. Wilkins, the proprietor of this great public convenience. Dinner on the table at 4 for 5. Tickets, 3s. each, to be obtained of Mr Parker, and of Mr Deacon, the Clerk of the Market. Mr Benham Nesles, the Government Auctioneer, has kindly consented to take the Chair.

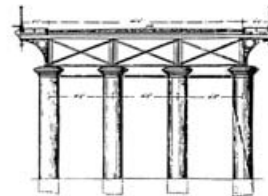
After waiting years for a decision, William Wilkins built his own bridge near his hotel, the Market-house Inn. It was opened on 16 December 1844. The bridge was built of solid logs and chained to a tree. For nearly three years it remained standing while other bridges in the city were washed away by floods. Finally, in July 1847, the stout little bridge and the tree it was tethered to were swept away in a great flood.

Thebarton Bridge 1848-1879



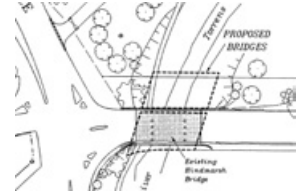
The loss of Wilkins Bridge was keenly felt and a new bridge was designed by Captain Edward Frome, the Colonial Engineer. Built by the Government, it was probably similar to another bridge designed by Frome in the city (see above). The new bridge was opened in August 1848. In 1860 a toll was introduced on the Port Road (only the second in the Colony) and a toll house was erected at the northern approach. Tolls were removed at the end of 1870.

Hindmarsh Bridge 1880-1993



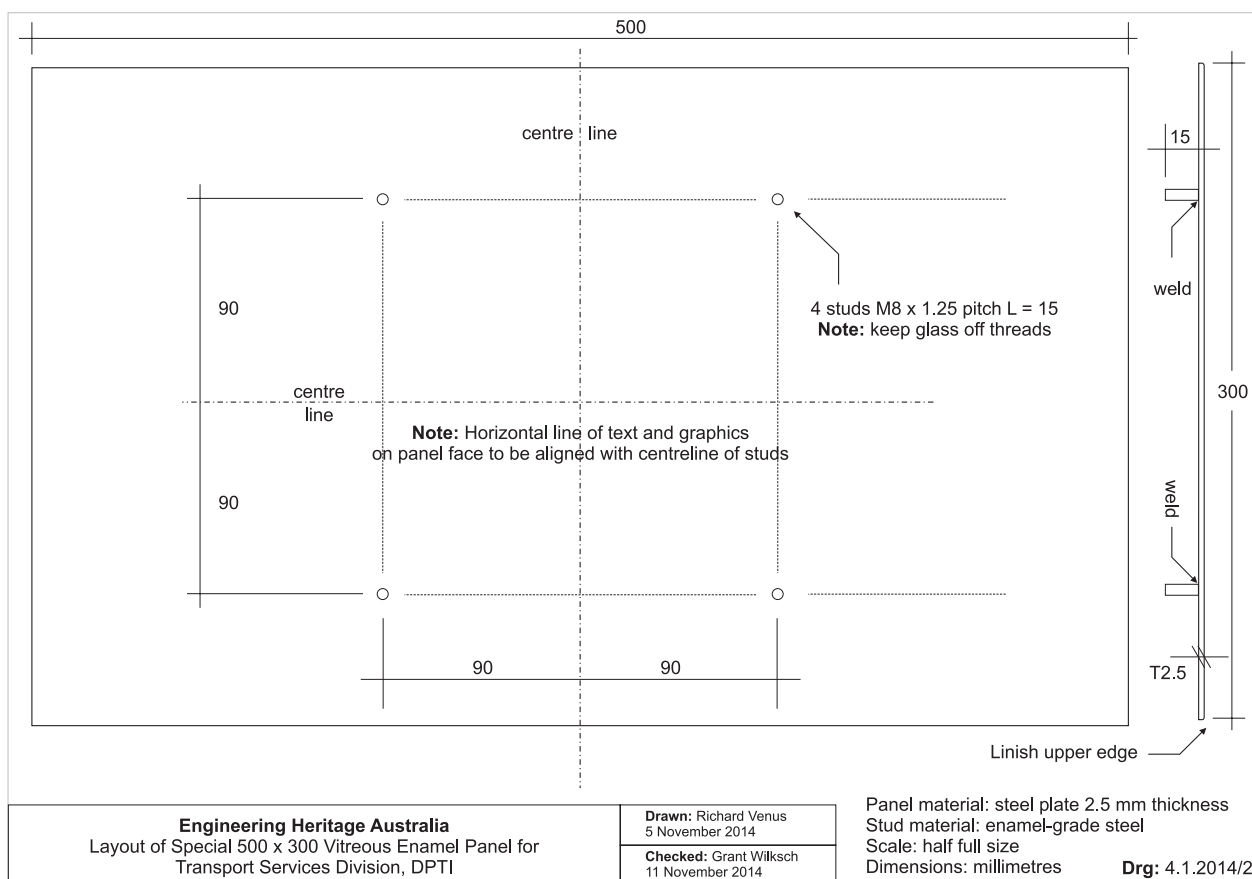
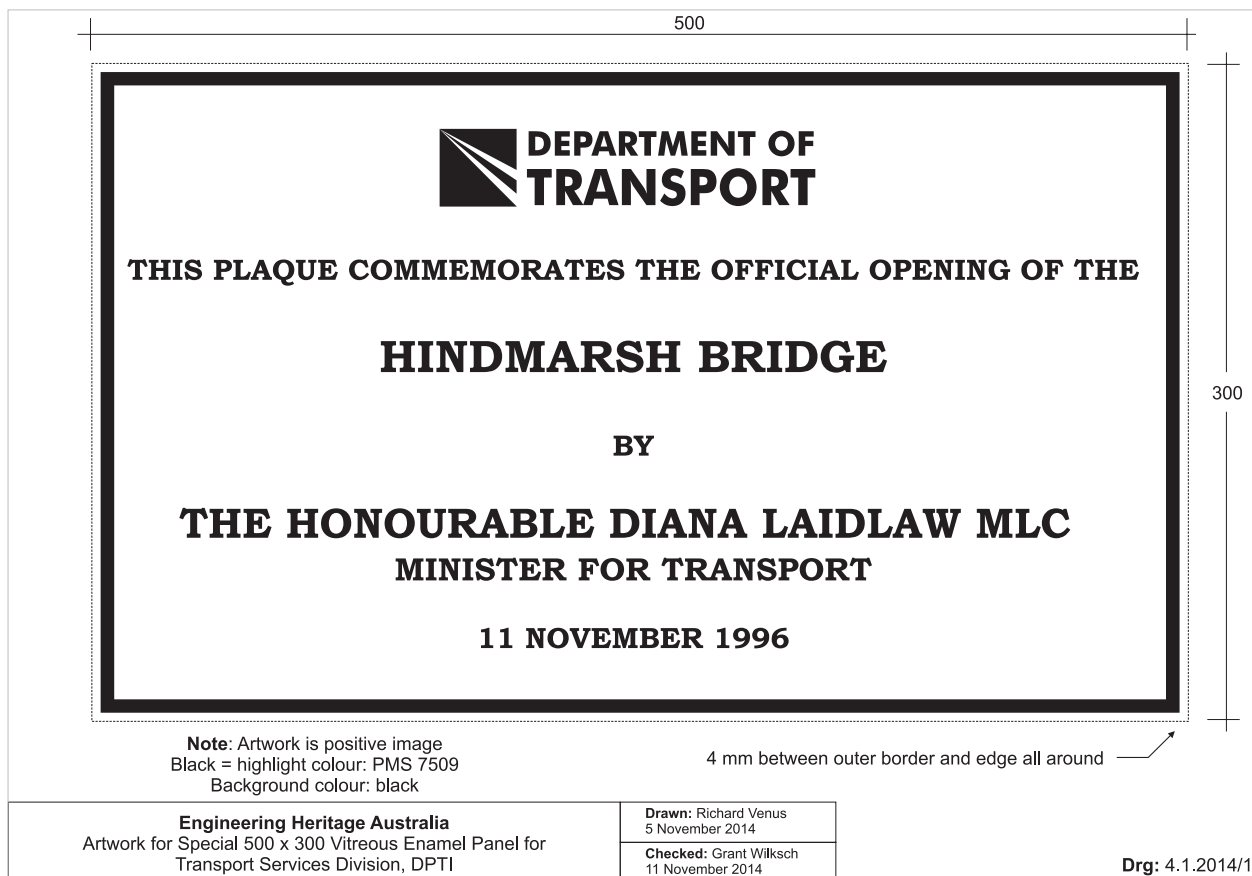
By 1878, the wooden bridge was no longer safe for traffic. Tenders were called for a wrought iron girder bridge with masonry abutments in 1879 and the contractors, Davies & Wishart, began work in July. The cast iron piers were leftover from the bridge at Murray Bridge. The iron bridge was opened on 14 August 1880 and named the Hindmarsh Bridge. As traffic increased over the years, the bridge had to be widened twice – once in 1926 and again in 1954.

Hindmarsh Bridge 1996



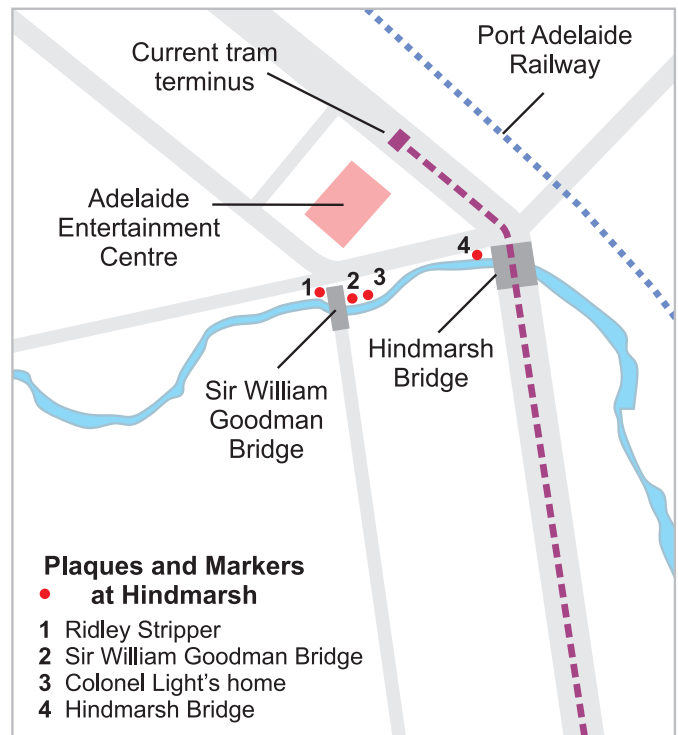
When tests showed that the 1880 bridge was overloaded, a new bridge was needed. It was built in two sections. The first was built to the east of the old bridge and traffic was diverted onto it in October 1995. The old bridge was then demolished and the second section was built in its place. Concrete slabs covered the gap and formed the median strip. The bridge was opened on 11 November 1996. In 2010 a new girder and central deck were constructed to carry trams.

Draft interpretation mini-panel for the Port Road Crossing



Artwork and drawing for the replica plaque at Hindmarsh

***Note:** Rather than attempt to match the location of the existing mounting holes, we have adopted the same fixing arrangements and stud placement for the replica as are used on the Markers.
This will enable the same drilling template to be used.*



7.2 Location

The inner suburban area of Hindmarsh was the first township to be established outside the City and was named after the Colony's first Governor.¹²⁷ The river attracted industries such as tanneries, wool-washing, flour mills and breweries¹²⁸ which resulted in the need for the reliable river crossing which is the subject of this nomination.

The bridge which opened in 1880 was used by the first horse tram service to Hindmarsh. Three decades later, when the horse trams were being replaced by electric traction, the Municipal Tramways Trust decided to build its own river crossing some 300 metres downstream. This was Metropolitan Adelaide's first reinforced concrete bridge which was awarded an Engineering Heritage Marker in September 2014.

It was also in this prime location John Ridley established his flour mill and workshop. Here, in mid-December 1840,¹²⁹ Ridley produced the first flour ground in the Colony. (Prior to that, wheat had to be sent to other colonies or as far away as India to be milled.) Ridley had arrived in the Colony on 17 April 1840, bringing with him a steam engine, "part of the force of which I intended to appropriate to the driving of a saw mill, and part to the grinding of flour".¹³⁰ The boiler was first fired on 11 August 1840 and Ridley said he expected to be able to commence milling in about six weeks.¹³¹

A few years later, Ridley and his staff built the first mechanical harvester in the workshop adjoining the mill. After a few modifications to his first attempt, the machine was successfully put to work in a wheatfield just south of the city on Tuesday 14 November 1843.¹³²

Ridley's stripper was recognised in 1986 with an Historic Engineering Marker at Roseworthy College; that plaque is now missing and was replaced with an Engineering Heritage Marker and interpretive panel as part of the landscaping works for the Sir William Goodman Bridge. This is, in fact, a more significant site, being just across the road from Ridley's workshop.

On the other side of the river, Colonel William Light purchased Section No 1 in the Hundred of Adelaide and made his home there. In 1997 a plaque was placed on the northern bank by the Royal Geographical Society of South Australia to recognise the site of Light's home. Taken together, this plaque and the three Engineering Heritage Markers constitute a significant state heritage precinct.

¹²⁷SA Gazette and Colonial Register, 21 July 1838, p3c

¹²⁸ Susan Marsden, 1983, *Hindmarsh: A Short History*, SA 175 website, Professional Historians Association, <www.sahistorians.org.au/175/documents/hindmarsh-a-short-history.shtml> viewed 12 January 2014

¹²⁹ *Southern Australian*, 25 December 1840, p3d

¹³⁰ Letter from Ridley to the Editor, dated 13 August 1840, *Southern Australian*, 14 August 1840, p3e

¹³¹ SA Register, 11 August 1840, p3a

¹³² SA Register, 15 November 1843, p2c



*Part of the 2014 Christmas display at the Southwark Brewery with the Port Road bridge interpretive area on the right; the red and grey building is a carpark on the site of John Ridley's flour mill
[photo: Richard Venus 5167, November 2014]*

On the southern side is the Southwark Brewery which attracts large crowds in the weeks leading up to Christmas with its lighting and displays along the banks of the Torrens. These displays began in 1958, the year of the first Adelaide Festival of Arts.¹³³

Further contributing to the high traffic of the area are the Adelaide Entertainment Centre and the Hindmarsh Stadium, formerly the Hindmarsh Oval, which is home to the Australian A-League team, Adelaide United. And tucked in its shadow are the premises of the Hindmarsh Historical Society, the Hindmarsh Fire & Folk Museum housed in the former Hindmarsh Volunteers Fire Brigade building.

The brewery itself is also of heritage significance, dating back to 1886 when Alexander and Thomas Ware established the Torrenside Brewery in 1886. In 1898 they amalgamated with Edward Clarke's East Adelaide Brewery at St Peters to form Clarke Ware & Co and transferred all brewing to Torrenside.

Later that year the new company sold their interests to the long-established Walkerville Cooperative Brewery who closed their Walkerville premises and transferred all their equipment to Torrenside. The business was taken over by the South Australian Brewing Company (SABCo) in 1938 and the site became known as the Southwark Brewery in 1951.¹³⁴

In 1969, the first two stainless steel outdoor storage tanks, each with a capacity of 80 000 gallons and which are such a distinctive feature of the site, were installed at Southwark. This marked the move to close down the Company's city premises and transfer all brewing and packing operations to Southwark. The West End Brewery was closed in 1980.¹³⁵ The subsequent expansion of the Southwark Brewery has swallowed up Winwood and later Cawthorne Streets with Holland Street now its western boundary.

¹³³ Michael Cudmore, 1988, *History of the South Australian Brewing Company Limited: 1888-1988*, SA Brewing Co Ltd, Thebarton, p124

¹³⁴ This helps date the photo on page 4 as after 1948 and before 1951. When SABCo took over the Walkerville brewery they changed the name to Nathan. The condenser tower in front of the chimney was installed in 1947-48 and the Nathan name was changed to Southwark in 1951 Thank you to Alison and John Painter [emails 9 and 10 December 2014].

¹³⁵ Cudmore, 1988, p154

Appendix 3: Ceremony Report



(Top and left) Views of the interpretation area with markers in place (above) dedication ceremony on 16 December 2014

The significant date for the crossing was 16 December 2014, the 170th anniversary of the opening of the first bridge at the site. This coincided with the Christmas lighting season on the banks adjacent the brewery and a well-supported home match for Adelaide United at the Hindmarsh soccer stadium. We were therefore advised against holding an event of any magnitude at the site.

The City of Charles Sturt had organised a major event only a few months before to formally open and name the Sir William Goodman Bridge and were not interested in participating in another ceremony. We also saw no point in asking the current state government Transport Minister to take part in a ceremony that included the replacement of a plaque dedicated by a Minister of a former government. In addition, the SA Division has no budget for staging events.

The Engineering Heritage SA committee therefore held their end-of-year meeting at the interpretation area where committee chair Richard Venus summarised the historic connections with the site and formally dedicated the Engineering Heritage Marker for the Port Road Crossing.

Installation of the marker and plaque was done by Ben Griffith from Synergy Remedial assisted by Richard Venus who documented the procedure for future installation guidance (See Appendix 3, page 38).

Installation of Marker Plates

Method 2: Fixing to masonry



ENGINEERS
AUSTRALIA

For masonry fixing, the stud is extended by fitting a coupling nut which is approximately 25 mm long and screwing into it a piece of M8 threaded rod 60 mm long. This produces an extended stud with an overall length of 75 mm. See drawing 2.1.2014.

To fit the Marker:

1. Determine the location of the Marker and, using the fixing template (drawing 3.1.2014), mark the centres of the four mounting holes. Check the template against the actual stud placement and mark any offsets needed. Also consider how to support the Marker while the epoxy cures.
2. With an 8 mm masonry bit, drill four pilot holes about 10-15 mm deep and test fit the Marker, making sure it is correctly set to the horizontal. Make any adjustments necessary.
3. Using an 18 mm masonry bit, custom drill four holes 80 - 90 mm deep. Blow all dust out of the holes and check the fit of the Marker.
Note 1: If the masonry surface is uneven, some dressing might be required so the Marker sits flush.
Note 2: Ensure the adhesive nozzle will fit into the hole. Choose a larger bit size if necessary.
4. If there are concerns about the sealant marking the masonry, the area around the Marker will need to be protected with masking tape. Use flexible painter's tape to follow the curve.
5. Prepare the epoxy adhesive for use, following the instructions and recommendations. Most epoxies are supplied in two cartridges with a mixing nozzle. Ensure epoxy is placed all the way to the bottom but do not overfill the hole. A small amount of excess epoxy will spread over the back of the plate and help secure the Marker.
6. Apply about a 10 mm bead of sealant around the perimeter of the Marker. The sealant will be squeezed out all around the periphery to fill a gap of about one or two millimetres between the Marker and the masonry surface.
7. Place and press the Marker into position, checking by eye (or smart phone "spirit level" app) the orientation to the horizontal. The sealant should develop sufficient grab after a few minutes to hold the Marker but provide temporary support if needed.
8. Clean up extruded sealant with appropriate solvent and ensure the finish is neatly done, adding additional sealant if needed to fill any voids.
9. After the necessary curing time, remove any masking tape and temporary support.

Materials:

Epoxy two-part adhesive – HILTI HIT, Powers Pure 150 Pro (PF-Pro), or equivalent

Polymer sealant – Soudal MS35, Parchem Emer-Seal PU25, or equivalent; choose a sealant colour to suit the masonry surface ("driftwood" was used in this example)

Note: Do not use silicon sealants



Appendix 3: References & Bibliography

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- John Radcliffe and Christopher Steele, 1974, *Adelaide Road Passenger Transport 1836-1958*, Libraries Board of South Australia, Adelaide

Appendix 4: Acknowledgements

State Library of South Australia

Grant Wilksch and Bob Gilbert, Department of Planning Transport and Infrastructure

Vern Butler

Leo Noicos and John Woodside, Engineering Heritage SA

Kirsten Alexander, Phil Hewitt, and Linda Lacey, City of Charles Sturt

Trevor Porter, Hindmarsh Historical Society

Tom Pearce, Hamish Burnett-Read, and Ben Griffith, Synergy Remedial Pty Ltd

Dr John Radcliffe

Deane Kemp

David Hale, MAPCO

David Burvill

Alison and John Painter

